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The purpose of the current investigation was to assess the cognitive appraisal of stress and coping ability of Basic Combat Training (BCT) Soldiers experiencing an injury and some of the variables that predict cognitive appraisal. BCT soldiers train at high intensity rates for 10 weeks and are considered today's tactical athletes due to the high intensity training to prepare to defend the nation. Training consists of basic soldiering skills, including an extensive amount of marching, marksmanship, Army combatives, and drill and ceremony. For some, this high intensity training results in injuries very similar in nature to those that athlete's experience. For this reason a model originally designed for use with injured athletes was utilized as a framework to begin to research the injury experience for BCT soldiers. Previous research on cognitive appraisal of injury in athletes provides support for cognitive appraisal models (Brewer, 1994; Wiese-Bjornstal, Smith, Shaffer, & Morrey, 1998) as an appropriate framework for understanding how individual's react to injury. According to Brewer and Cornelius' (2003) review of the psychology of injury literature, Wiese-Bjornstal et al.'s (1998) integrated model is the most comprehensive model and has received the most consistent empirical support, thus this model was the basis for this study. This study examined how variables related to the injury itself (injury type, perception of injury severity), individual difference variables (injury history, self-motivation, soldier identity, social desirability, coping resources), demographic variables (age, gender, prior sport experience), and time in BCT predicted primary and secondary cognitive appraisal. Information was gathered from injured

soldiers through self-report measurements during a visit to a physical therapy clinic for the injury as well as data resulting from an evaluation of the injury by a physical therapist. Multiple regression analysis found 25% of the variance in primary cognitive appraisal for participants ( $N = 189$ ) was predicted by the variables, with soldier identity, social desirability, coping resources, and perception of injury severity were significant predictors. The variables accounted for 35% of the variance in secondary cognitive appraisal, with the significant predictors being soldier identity, social desirability, coping resources, and perception of injury severity. This research was the first to explore the cognitive appraisal of BCT soldiers and will lead to a better understanding of the experience. The long-term goal of this line of research is to develop interventions to assist in the rehabilitation process to improve the probability for soldiers to return to duty after experiencing an injury.

BASIC COMBAT TRAINING SOLDIER'S  
COGNITIVE APPRAISAL OF  
INJURY

by

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## CHAPTER I

### INTRODUCTION

In order to adequately examine the effects of training-related injuries, we first need to define what an injury is. One effective way of defining a training-related injury includes: a) time lost from participation in activity, b) a medical diagnosis verifying injury, and c) consultation with a medical professional (Sachs, Sitler, & Schwille, 2007). This definition works for a variety of populations as it encompasses injuries that result from competitions, physical training, and accidents. Many consider that the physical damage often leads to a process of rehabilitation and recovery from the injury. This process is itself a very complex challenge for some individuals. Sometimes the challenging aspects are not limited to physical pain, but also include psychological and emotional distress that accompany the slow and painful process of recovery. The recovery process can feel like a roller coaster ride because, for example, the injured individual may make progress psychologically but then have a set back with his/her physical recovery. Additionally, the healing process can be different depending on the type of injury. Individuals may experience an acute injury or an overuse injury. An acute injury is one that happens suddenly when damage is done based on a



single episode, this is also known as a macrotrauma. Some examples of acute injuries are fractures, muscle strains, and contusions. An overuse injury is one that can take a long time to cause damage and is caused by repeated overuse and a lack of proper recovery time, also known as microtrauma. Stress fractures are an example of an overuse injury.

When athletes sustain injuries, the primary focus of sports medicine practitioners is, understandably, on the physical aspects of treatment and recovery. However, in addition to the physical consequences of sport injury, the psychological functioning of athletes may also be profoundly affected by injury. In particular, athletes differ in terms of their psychological and emotional reactions to the injury. This is important because athletes' psychological and emotional reactions to the injury may affect how they behave in the rehabilitation process, including how well they follow medical professionals' instructions and how committed they are to the physical therapy necessary to recover. Obviously, this then has implications for how quickly the injury heals (Brewer 1994; Wiese-Bjornstal, Smith, Shaffer, & Morrey, 1998). For example, if athletes are struggling in their psychological and emotional response to the injury, they might be less likely to do prescribed exercises at home or may not show up for medical appointments. This lack of compliance has a direct impact on their ability to recover. While adherence to a rehabilitation program will often lead to successful recovery, how an individual responds psychologically and emotionally to that injury and rehabilitation process can determine how likely he/she is to adhere to the rehabilitation plan. For example, research has demonstrated that individuals who have high adherence rates to their rehabilitation

program also report a high ability to cope with their injuries (Daly et al. 1995), have high rehabilitation self-efficacy (Taylor & May 1996), perceive little threat to their self-esteem (Lampton et al. 1993), attribute their recovery to stable and personally controllable factors (Laubach et al. 1996), set rehabilitation goals, and use imagery and positive self-talk (Scherzer et al. 1999). Thus, the psychological and emotional aspects of experiencing an injury might influence behavioral responses to that injury. Cognitive appraisal is the result of a person assessing an aspect of their environment to determine if the aspect is a threat or not, and if it is found to be a threat to the individual, in what way will it impact the individual. Two athletes can have the same injury and will likely respond in different ways. This is thought to be the result of the cognitive appraisal of the injury. Possibly athlete A sees the injury as a welcome break from high intensity practice, while athlete B views the injury as the end of his career. Athlete A and athlete B will likely respond differently and their behavior can impact their rate of healing. The Integrated Model of Psychological Response to the Sport Injury and Rehabilitation Process (Wiese-Bjornstal et al., 1998) has received consistent research support (Albinson & Petrie, 2003), and suggests that once the injury occurs, the injury is viewed as a stressor by the athlete, which leads to a process involving thoughts, feelings, and actions. There are a variety of factors affecting the process, including moderators and mediators of response (Wiese-Bjornstal et al., 1995). These moderators and mediators include a multitude of personal and situational factors such as age and gender (Brewer et al., 2007, Wiese-Bjornstal, 2003), injury factors, and environmental factors (Bone & Fry, 2006).

Specifically, according to the integrated model, an athlete's cognitive appraisal determines his/her psychological reactions.

Lazarus and Folkman's (1984) transactional model of stress and coping defines primary appraisal as concerning the discrimination between transactions in which there is some personal investment and those that are irrelevant for the individual's well-being. The secondary appraisal concerns the individual taking into account which coping options are available, the likelihood that any given coping method will accomplish what it is supposed to, and the likelihood that one can apply a particular coping strategy or set of strategies effectively. Individuals will then experience stress if they perceive that the demands of a personally significant event outweigh their abilities to cope with the event. Cognitive and behavioral strategies are then invoked to help the individual to cope with or at least accept the demands associated with the stressful event (Albinson & Petrie, 2003). Based on research by Albinson and Petrie (2003), primary cognitive appraisal is examining appraisals of the stressor and secondary cognitive appraisal is examining appraisals of coping ability.

Injury experiences and injury recovery are important concerns for the United States Army, especially with respect to soldiers going through Basic Combat Training (BCT). The Army spends an estimated \$67,100 per recruit from the time the individual walks into the recruiting office until arrival at the first duty station (Thomas, Information Paper, 22 Feb 08). This time period includes BCT and Advanced Individual Training (AIT). BCT soldiers train at high intensity rates for 10 weeks. Training consists of basic

soldiering skills, including an extensive amount of marching, marksmanship, modern Army combatives, and drill and ceremony. Ft Jackson, South Carolina is one of four training locations that conduct BCT. Ft. Jackson is responsible for training 50% of all incoming soldiers in the Army, and as many as 80% of the female recruits. For this reason, Ft. Jackson is an ideal location to conduct research on BCT soldiers.

The Army's program for soldiers who are injured enough to be removed from training during BCT is the Physical Training and Rehabilitation Program (PTRP). Once a soldier informs his/her Drill Sergeant of an injury, he or she is sent to the Physical Therapy/Occupational Therapy clinic to determine the extent of the injury. During this time soldiers complete a screening form and are evaluated by a physical therapist to, amongst other things, allow the clinic to determine if the injury warrants recommendation into PTRP. Based upon the information the soldier provides on the screening form and an evaluation by a physical therapist, a recommendation is made for the soldier to either enter the PTRP or return to duty. The PTRP is a special unit designed to treat injuries severe enough to prevent a trainee from fulfilling BCT requirements. Once a soldier is evaluated by a physical therapist and is recommended by the PT clinic to be transferred to PTRP, the soldier's chain of command is responsible for actually processing the paperwork necessary for the soldier to be transferred to the PTRP. This process varies based on the unit and other circumstances, thus there is not a definitive amount of time that a soldier can expect to wait prior to receiving rehabilitation treatment for his/her injury (Knapik, Hauret, & Jones, 2006). For a soldier to stay with his/her BCT unit and

not be allowed to train for any length of time can be frustrating. Imagine the soldier who is given crutches and placed on a medical profile to not train for the day or two it might take to process paperwork and transfer to PTRP. The soldier is still required to be with the training unit so he watches his fellow soldiers continue training and learning new skills that he is not allowed to practice due to his injury. This scenario might be similar to an athlete who watches his teammates play and practice, but one difference between the two is that BCT soldiers cannot escape from their peers and Drill Sergeants with whom they interact and live 24 hours a day, every day of the week, and the cultural attitude toward injury in the armed forces can be maladaptive. Soldiers often are referred to and begin to be identified as ‘broken’ as an indication that they cannot train at the same level as their non-injured peers. Injured soldiers are sometimes shuttled onto a truck for transport when their peers march to and from training events. Unless the injured soldier is transferred quickly to PTRP, he or she may spend 24 hours a day surrounded by peers who serve as a constant conscious and subconscious reminder of the injury and the impairment that comes with it. These soldiers are called out for needing special treatment (can’t march with unit, need others to carry meal trays in dining facility). This situation may have an impact on the soldier’s stress level. Because of the impact the soldier’s psychological response can have on recovery it is important to understand how the injury impacts a soldier mentally.

As an example of the volume of injuries that occur during BCT, the 2007 rate of recruits referred to PTRP at Ft. Jackson, South Carolina was 1.5% of total Basic Trainees.

Of those who are referred to PTRP, typically 41% are able to return to duty (RTD) and 59% are discharged from service (DFS) as a result of being unable to recover fully from the injury (S.J. Scott, personal communication, November 13, 2008). For the soldiers who RTD, women are in PTRP for an average of 77 days and men an average of 71 days prior to returning to BCT (Hauret, Knapik, Heckel, Duplessis, 2002). This length of time can have a significant impact on the soldiers as well as on the Army. The soldiers have typically planned to be in BCT for 10 weeks; thus, the extra time away due to injury results in them being away from family and friends for substantially longer than anticipated. This extra time away from family and friends can place a significant strain on personal relationships, which may exacerbate the recovery process. Aside from the soldier's experience, the Army spends a lot on resources to take care of each soldier through medical costs (e.g., doctors, physical therapists, athletic trainers, medical facilities, rehabilitation equipment), training expenses (e.g., soldier's salary and benefits, housing, base support, facilities costs), and the expenses associated with the cadre in charge of the soldiers (e.g., drill sergeants', support staff's and commander's training costs, salaries, benefits). Simply stated, reducing the time it takes a soldier to RTD is an important goal because of the financial and personal impact of extended injury recovery periods. The most effective method of reducing recovery time is to develop improved recovery processes for the soldiers. In order to improve the services available to these soldiers, we first must understand how soldiers appraise the injury.

Most of the research examining injuries and the recovery process has been conducted with athletes experiencing sport injuries. Currently there is a lot of attention being placed on how to prevent injuries resulting from athletic endeavors (Hagglund, Walden, & Atroshi, 2009; Hush, 2008; Knapik, Marshall et al. 2007; Rashiraj et al. 2009). This research may be relevant to the Army as well in their efforts to refine training with an effort to reduce trainee injury prevalence. Obviously, prevention of injury is extremely important and valuable and deserves attention, but this is only one aspect of the problem. There has been some research (Knapik et al., 1998, 2001, 2008) by the United States Army Center for Health Promotion and Preventive Medicine that focuses on tracking injury incidence in an effort to explore ways to lower the number of soldiers experiencing injuries in BCT. However, because injuries are likely to occur during BCT regardless of prevention attempts, research should also focus on how to assist injured BCT soldiers in their recovery process.

The research investigating injured athletes has explored the psychological responses of athletes and the literature in this area continues to grow. Researchers began to investigate how individuals respond to injury in the 1960's (Little, 1969, Suinn, 1967). Research has examined the emotions that arise from experiencing an athletic injury and athletes commonly report feelings of anger, confusion, frustration, fear, and depression (Bianco, Malo, & Orlick, 1999; Gordon & Lindgren, 1990; Johnston & Carroll, 1998; Sparks, 1998; Udry, Gould, Bridges, & Beck, 1997).

As a way to explain the responses athletes have to injury, researchers have developed a variety of theoretical models. Early models were considered stage models. Stage models take the position that an individual experiencing an injury will progress through a series of stages on their journey from injury to recovery. Early on, when interest in this phenomenon began, there were researchers who associated an athletic injury with some sort of loss. That loss was linked to the Grief Model presented by Kubler-Ross (1969), which became a framework for understanding how individuals with terminal illnesses coped with their emotions. As the model was adapted for other injured populations, the model suggested that individuals proceed through each of the stages (denial, anger, bargaining, and depression) in sequential order before they come to acceptance of their injury. Researchers found that athletes experience many of these same emotions following an injury (Astle, 1986; Lynch, 1988; Rotella, 1985; Silva & Hardy, 1991) which led them to believe that these models were appropriate for explaining an athlete's response to injury. However, Kubler-Ross' Grief Model is not currently used in sport injury research because of the recognition that the stages of grief experienced by terminally ill patients may not be entirely generalizable to the experience of having a sports injury (Smith, Scott, & Wiese, 1990). While some athletes certainly can experience a severe reaction, a grief-like response might be limited to severe or psychologically traumatic injuries (Heil, 1993) and not widely applicable to the vast majority of athletic injuries. Other stage models which suggest that individuals must go through emotional stages sequentially have also not been empirically supported (Brewer,



1994; Silver & Wortman, 1980; Walker, Thatcher & Lavalley, 2007). In a general sense, there does not appear to be enough flexibility in stage models to allow for individual differences to be considered, as stage models assume that all athletes will go through the series of stages in specific order (Brewer, 2005). However, research on stage models led researchers to develop cognitive appraisal models to understand an individual's response to injury.

### **Cognitive Appraisal Models**

The basic premise of cognitive appraisal models related to injury are that behavioral and emotional responses influence, and are influenced by, an individual's cognitive appraisal of an injury situation. The injury is viewed as a stressor, and the response of the individual depends on a variety of factors that impact how the individual interprets the injury. Lazarus and Folkman (1984) developed a transactional model of stress and coping, in which they described cognitive appraisal as consisting of two processes: (a) primary appraisal and (b) secondary appraisal. The primary appraisal involves the individual asking, "Is this harmful to me?" The answer the individual comes up with leads to the secondary appraisal, which is determined by the answer to the question, "Will I be able to cope with this situation, and, if so, how?" When an individual perceives the situation to be beyond his/her ability to cope with the situation, the individual experiences a stress response. The individual proceeds to engage in behavioral and emotional responses as a means to handle the perceived stressful situation. Wiese-Bjornstal (2010) further describes cognitive appraisal as encompassing the many

conscious assessments athletes make after an injury, such as assessments of their sense of self (Smith et al., 1993), identity, loss, optimism, challenge, or burnout (Cresswell & Eklund, 2006). These conscious assessments are then expected to have an influence on the psychological responses of emotion and behavior as well as physical recovery. There have been several cognitive appraisal models developed over the years to describe an athlete's response to sports injury (e.g. Gordon, 1986; Grove, 1993; Weiss & Troxel, 1986; Wiese-Bjornstal et al, 1998). The research provides general support for cognitive appraisal models (Brewer, 1994; Wiese-Bjornstal, Smith, Shaffer, & Morrey, 1998) as an appropriate framework for understanding how individual's react to injury. The benefit of cognitive appraisal models that does not exist with stage models is that they allow for flexibility in explaining how personal and situational factors influence the initial appraisal and possible re-appraisal of the injury. When reviewing the psychology of injury literature, Brewer and Cornelius (2003) found Wiese-Bjornstal et al.'s (1998) integrated model to be the most comprehensive model. Wiese-Bjornstal et al.'s (1998) model has received considerable empirical support, thus this model will be tested in this study.

Currently there is no literature that examines the psychological response of soldiers who incur an injury. The intensity at which BCT soldiers train is similar to that of athletes during their training and they incur similar types of injuries (Brennan, Kane, & Jarvis, 2007). For this reason, using a theoretical model developed to understand sport

injury is an appropriate framework to begin to understand how a soldier psychologically and emotionally responds to injury.

The goal of this study is to use Wiese-Bjornstal et al.'s integrated model (see Figure 1) to examine how soldiers who are injured during BCT cognitively appraise the injury. Some factors proposed to be influential in this appraisal process are age, type of injury, injury severity, length of time in BCT, self-motivation, and coping resources. This preliminary work with injured soldiers is based on the integrated cognitive appraisal model and measures have been chosen to represent the majority of the components expected to impact cognitive appraisal those measures which have been found to be relevant in previous psychology of sport injury research. The intent is to assess factors suggested to be influential in the cognitive appraisal of the injury that are relevant to soldiers who have just been injured and have not yet entered the rehabilitation phase. Thus, this study will examine variables related to the injury itself, individual difference variables, demographic variables, and time in BCT (see Figure 1) as predictors of the soldier's cognitive appraisal of their injury. Specifically, injury diagnosis, whether the injury is acute or an overuse injury, and a rating of the perception of injury severity will be collected. Self-motivation, soldier identity, social desirability, and coping resources will also be assessed in relation to the cognitive appraisal. The cognitive appraisal will be assessed prior to being seen by clinic staff, as well as after being evaluated. The Integrated cognitive appraisal model (Wiese-Bjornstal et al. 1998) includes a dynamic list of factors as influencing and being influenced by cognitive appraisal. This study is

designed to examine injury factors (history, perception of severity, type), individual differences (self-motivation, athletic identity, coping skills), demographic variables (gender, age, prior sport experience), cognitive appraisal (primary and secondary cognitive appraisal of stress), and situational factors (time in season-for this situation time in basic combat training). The results from this research will contribute to our overall understanding of how soldiers in BCT appraise an injury. This research will be the first step in a line of research seeking to understand the cognitive appraisal of soldiers injured in BCT. Once the cognitive appraisal process is established, the next goal in the future of the research could be to examine interventions designed to improve the psychological and emotional responses to injury.

### **Hypotheses**

1. It is hypothesized that cognitive appraisal of injury will be predicted by
  - a. injury history (previous experience would be associated with lower scores on primary and secondary cognitive appraisal)
  - b. injury severity (higher perception would be associated with higher scores on primary and secondary cognitive appraisal)
  - c. injury type (an acute injury would be associated with higher scores on primary and secondary cognitive appraisal as compared to a chronic injury)
  - d. self-motivation (higher would be associated with higher scores on primary and secondary cognitive appraisal)

- e. soldier identity (higher would be associated with higher scores on primary and secondary cognitive appraisal)
  - f. coping resources (higher would be associated with lower scores on primary and secondary cognitive appraisal)
  - g. gender (female would report higher scores on primary and secondary cognitive appraisal as compared to males)
  - h. age (younger age would be associated with higher scores on primary and secondary cognitive appraisal)
  - i. prior sport experience (would be associated with lower scores on primary and secondary cognitive appraisal)
  - j. time completed in BCT (a longer time in BCT would be associated with higher scores on primary and secondary cognitive appraisal)
2. It is hypothesized that primary and secondary cognitive appraisal of injury would differ as a function of injury type.

The logic underlying the hypotheses is as follows. Individuals having experienced an injury prior to the current injury would judge the injury as less stressful and would feel that the current injury was less difficult to deal with. Those viewing the injury as less severe would be expected to judge the injury as less stressful and easier to deal with. Individuals diagnosed with a chronic injury might feel like they have coped with the injury thus far and therefore feel that they can continue to do so. Thus they are expected to report less stress and a less difficulty dealing with the injury. The individuals rating

high in self-motivation would have the highest expectations for themselves in BCT and therefore would experience more stress and more difficulty dealing with the injury because it may prevent them from training. Along the same lines, individuals with a high soldier identity would be more likely to feel high stress from the injury and that the injury was more difficult to deal with as it could jeopardize their military career. A reported use of high levels of coping resources would reduce the perceived stress and allow an individual to report less difficulty dealing with the stressor. Being male and older would result in less stress and less difficulty dealing with the injury. Gender was expected to be related to primary and secondary cognitive appraisal based upon findings that females experience a difference in the psychological response from males following an injury (Granito, 2002). The history of having played sports or other competitive activities in the past will also be related to reporting less stress and less difficulty in coping with the injury. The longer an individual has completed in BCT, the more stress and the greater difficulty the individual would report being able to cope with the injury.

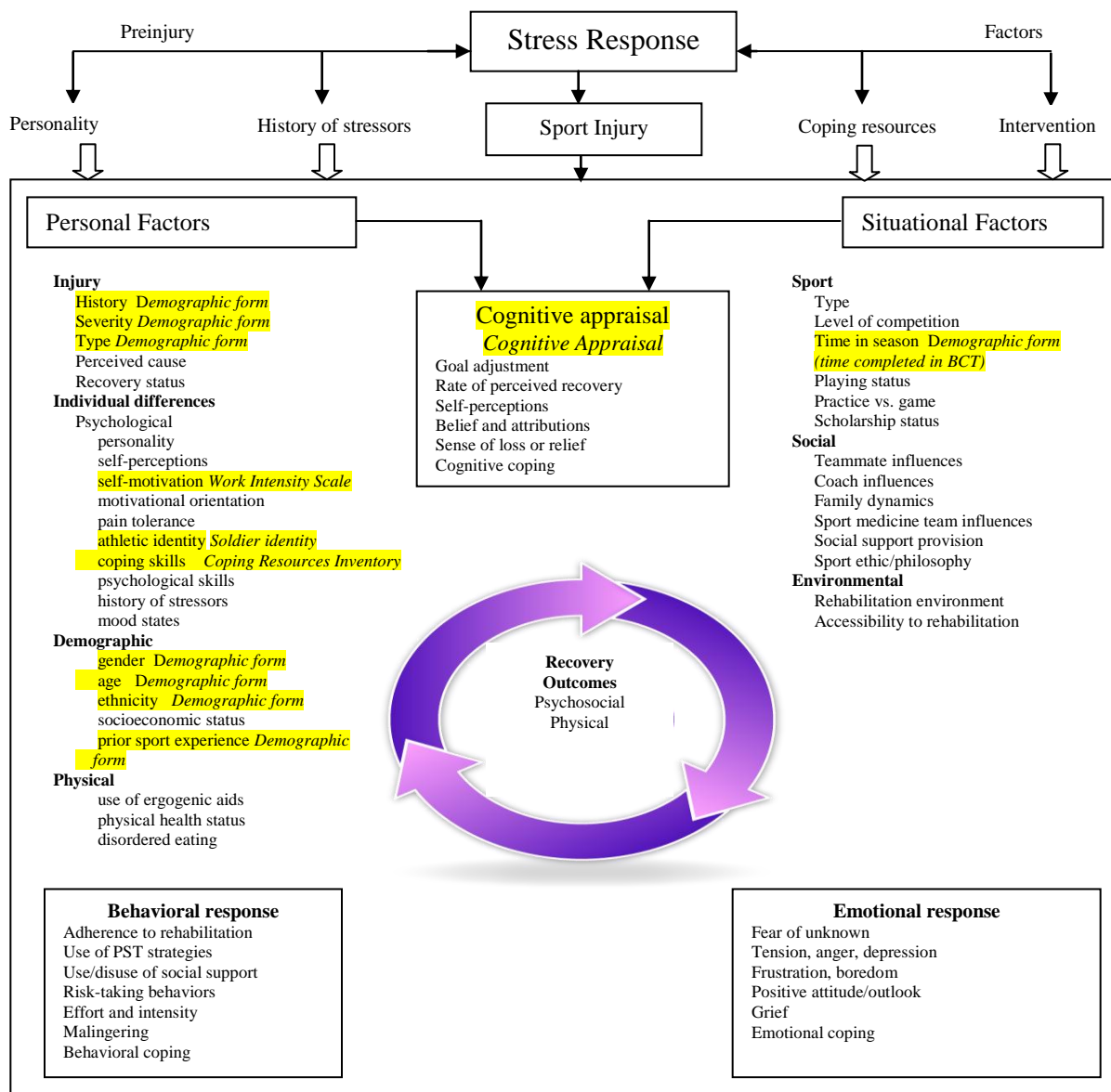


Figure 1. Framework for proposed study utilizing the Integrated Cognitive Appraisal Model (Wiese-Bjornstal et al. 1998). Aspects of the model to be measured highlighted in yellow, measurement italicized.

## CHAPTER II

### REVIEW OF LITERATURE

#### **Overview**

Given the current demands placed on today's military forces, efforts to maintain soldier's fitness levels and stay "mission ready" have led to this idea of a tactical athlete. While the military continues to develop improved methods of training soldiers, injuries often occur. The demands placed on soldiers in the physical fitness realm are similar to the high intensity physical training demands of athletics. This review of the current literature overviews athletic injury and psychological response to injury as well as how this body of knowledge links to the high pressure training environment of basic combat training.

#### **Athletic Injury**

Although much research has been conducted regarding the prevention of athletic injuries (Agel, Arendt, & Bershadsky, 2005; Hagglund et al. 2009; Herbert & Gabriel, 2002; Hush, 2008; Kibler, Chandler, Uhl, & Maddux, 1989; Knapik, Marshall et al. 2007; Lowery & Forsythe, 2006; Pine, 1991; Rishiraj et al. 2009; Sherman & Finch, 2000), science has not significantly reduced the amount of injuries athletes incur. The National Health Interview Survey is a face-to-face household survey conducted by the Centers for Disease Control and Prevention (CDC) and the National Center for Health Statistics. The results of the recent survey estimates that between 1997 and 1999, an average of 7



million Americans per year received medical attention for sports and recreation-related injuries (Conn, Annest, & Gilchrist 2003). Over the years, there has been improvement in physical training techniques and athletic equipment (e.g., shoes, protective gear), but that does not seem to have significantly reduced injury incidence (Bergandi, 1985).

### **Response to Injury**

Most athletes who incur an injury that results in a loss of participation time in their sport will consider that injury a loss of some sort. Whether that loss involves a loss of status on their team, loss of playing time, or loss of mobility, many would argue that an injury occurrence is disruptive. Little (1969) documented the impact injury and illness had in athletic males compared to non-athletic males. This research seems to have been the first to examine the emotional response to athletic injury.

In a study seeking to qualitatively examine the experience of injured athletes, Udry, Gould, Bridges, and Beck (1997) interviewed 21 US Ski Team athletes who experienced season-ending injuries during racing seasons from 1990 to 1994. They investigated how athletes felt about the athletic injury they sustained. Regarding the athlete's reactions to being injured, four general dimensions were gleaned from the in-depth interviews: (a) injury-relevant information processing/awareness (included pain of injury and rehabilitation, awareness of extent of injury, questioning injury, and knowing negative consequences of injury), (b) emotional upheaval/reactive behavior (emotional agitation, change in mood, and emotionally giving up), (c) positive outlook/coping attempts (acceptance and positive coping strategies), and (d) ambivalence. These dimensions describe the categories of what the athletes were feeling about their injury.

Interestingly, the researchers also described four possible categories of benefits: (a) personal growth (changed perspective, developing personality traits, recognized life outside of sport, and time management skills), (b) psychologically-based performance enhancements (improved confidence and mental toughness, motivation and realistic expectations), (c) physical-technical development (improved technical skills, and improved health), and (d) none. The identification of benefits of injury support the argument that once athletes are able to effectively cope with their injury, they can learn to appreciate aspects of the often difficult injury experience.

Research has strived to further describe responses of the athletic injury experience. Granito (2001) conducted a focus group with seven injured intercollegiate athletes in order to focus on the meaning of the injury. From the inductive analysis, Granito identified seven general categories of responses related to athletic injury. These categories included: personal factors, effects on relationship, sociological aspects, physical factors, daily hassles, feelings associated with injury, and rehabilitation. In a subsequent study, Granito (2002) described the athletic injury experience focusing on the differences that might exist between male and female athletes. His sample included 31 injured intercollegiate athletes (15 male and 16 female). He found that males and females had generally similar experiences in response to injury, but differences were revealed in three areas. In comparison to male athletes, female athletes were more likely to believe coaches treated them negatively due to the injury, less likely to discuss a significant other in the interviews, and expressed more concern about how their health would be impacted by their injury. These differences suggest that males and females

have slightly different psychological and emotional responses to the stimulus of an athletic injury.

More recently, researchers have moved beyond descriptive studies to examine how athletes respond to injury using a variety of theoretical frameworks to describe psychological and emotional responses and, in some cases, establish the phases of responses. Stage models and cognitive appraisal models will be discussed and the main focus will be on the integrated cognitive appraisal model by Wiese-Bjornstal et al. (1998) as research conducted based on the model has gained considerable empirical support (Brewer, 2003).

### **Models of Response to Injury - Stage models**

Historically sport psychologists working with injured athletes have attempted to explain how athletes respond to the injury and furthermore cope with the change an injury may bring. In the early years of this line of research, a number of authors (e.g., Astle, 1986; Lynch, 1988; Pedersen, 1986; Rotella, 1985; Rotella & Heyman, 1993; Wehlage, 1980) relied upon stage models to explain psychological reactions to athletic injury. Often times, an injury was seen to be synonymous with other situations in which people experience grief and loss (e.g., Brown & Stoudemire, 1983; Kubler-Ross, 1969; Shontz, 1975). Stage models of adjustment are generally based on the premise that the disability associated with injury constitutes a form of “loss” of an aspect of the self (Peretz, 1970, Rotella & Heyman, 1986). In most stage models of reaction to athletic injury, there is a belief that the individual who experiences an injury navigates through a series of stages in an orderly fashion that enables a positive outcome. Research does

support that athletes experience similar emotional distress to that of other situations that create grief reactions (Shelley, 1994; Macchi & Crossman, 1996). Shortly after incurring an injury, athletes have described experiencing negative emotions such as depression, frustration, confusion, anger, and fear (Bianco et al., 1999; Gordon & Lindgren, 1990; Johnston & Carroll, 1998; Shelley & Carroll, 1996; Shelley & Sherman, 1996; Sparkes, 1998; Udry et al., 1997). Research has sought to explore the degrees of emotional disturbance and at which time points athletes might experience the greatest amount of disturbance. Athletes tend to experience greater emotional disturbance following an injury than expressed before the injury (Dubbels et al., 1992; Leddy et al., 1994; Miller, 1998; Smith et al., 1993). A short period later, depression and frustration are often mentioned by athletes during rehabilitation. Once the athlete is close to recovery, depression and frustration are still common. It is at this time that fear of reinjury begins to emerge (Bianco et al., 1999; Johnston & Carroll, 1998). Despite the popularity of stage models in the applied literature, the notion of a stereotypic pattern of distinct emotional responses to loss has not stood up to empirical scrutiny (Brewer, 1994). For example, Silver and Wortman (1980) conducted an exhaustive review of the literature on coping with undesirable life events, including physical injury, and concluded that there is no substantial evidence for the stage-like pattern of responses to negative life events. Interestingly, a further point as to the lack of support of a sequential progression through each stage of grief towards acceptance, is that many athletes will experience a surge in negative emotions toward the end of the rehabilitation process in anticipation of returning to sport participation (Bianco et al., 1999; Johnston & Carroll, 1998; LaMott, 1994;

Morrey et al., 1999; Quinn, 1996). Thus, stage models are not prominent in recent research examining responses to sport-related injuries.

### **Cognitive Appraisal Models**

As the research demonstrated a lack of support for using stage models as a way to describe individual's reactions to injury, more researchers began looking for a way to account for individual athlete's differences in reactions to injury. According to Rotella and Heyman (1986), athletes perceive injury in various ways. Some view it as a disaster, others see it as an opportunity to display courage, and still others welcome it as a relief from the difficulty of practice or the embarrassment and frustration of poor performance, lack of playing time, or a losing season. Cognitive appraisal encompasses the many conscious assessments athletes make post-injury, such as about assessments that are made regarding sense of self (e.g., Smith et al., 1993), identity, loss, optimism, challenge, or burnout (e.g., Cresswell and Eklund, 2006). These assessments are then expected to influence affect-related psychological responses of emotion and behavior, as well as physical recoveries (Wiese-Bjornstal, 2010). Possibly the first to recognize that an athlete's cognitive appraisal of his or her injury generally depends upon specific factors was Suinn (1967). Suinn found that injured athlete's cognitive appraisal of an injury was a result of three factors. The first factor consists of the injured athlete's prior psychological level of functioning. The second factor includes the nature of the disability, the injury location, the severity of the injury, the duration of rehabilitation, and the resulting changes in the person's life-style. The third factor involves the meaning of

the disability to the patient. This was an important link in how all the factors influence/are influenced by an athletic injury.

Years later, researchers Weiss and Troxel (1986) were the first to identify the importance of examining both personal and situational factors as having an effect on how the athlete responds to the stress of an injury. They also identified the basic stress process model (Selye, 1974) as an appropriate beginning for understanding the sport injury process. In applying the stress process model, the sport injury is the stressor that triggers the cognitive appraisal. Weiss and Troxel proposed that the cognitive appraisal has an influence on an athlete's emotional response. This emotional response then has an effect on how the athlete behaves.

The benefit of cognitive appraisal models is that they allow individual difference to explain how an athlete feels about the injury rather than expecting all athletes to respond in the same way. As previously mentioned, the most comprehensive cognitive appraisal model is the integrated model proposed by Wiese-Bjornstal et al. (1998). This model proposes that there are preinjury and postinjury factors that influence how an individual responds to a sport injury, as displayed in Figure 1.

### **Integrated Model of Response to Sport Injury**

*Preinjury factors.* The preinjury factors that are included in the Wiese-Bjornstal model are directly from a model proposed by Williams and Andersen (1998). This model describes four factors that influence the occurrence of psychological stress. Those factors are personality variables (hardiness, locus of control), history of stressors (life event stress, daily hassles), coping resources (coping behaviors, stress management, and social

support), and psychological skills training interventions. The model suggests that as stress levels increase in performance situations, muscles become tight and tense, and attentional focus is disrupted. It is this response to the stress that leads to the increased likelihood that an injury will occur. The components have gained a significant amount of support over the years as being plausible determinants of injury (Petrie & Perna, 2004; Williams & Andersen, 1998). While research supports each variable as an antecedent of athletic injury, history of stressors has been studied the most, with the focus being on life stress and daily hassles. Research on coping resources (e.g., coping skills, social support) has demonstrated that these resources moderate the effects of stress on sport injuries (Hardy, O'Connor, & Geisler, 1990; Maddison & Prapavessis, 2005; Petrie, 1993; Smith, Smoll, & Ptacek, 1990). The Andersen and Williams (1988) model proposes that with psychological interventions, an athlete can reduce the impact of the stress. A reduced stress response is predicted to lead to reduced levels of muscle tension and better attentional focus, which is expected to lower the risk of injury. The research on interventions in preventing athletic injuries is limited, although supportive of stress management training as a means of reducing injury risk (Davis, 1991; Kerr & Goss, 1996; Maddison & Prapavessis, 2005; Perna et al., 2003). The four variables, alone or in combination, illicit a stress response, and once the stress response is elicited, the physiologic and attentional changes occur, which in turn influence the chances of incurring an injury (Williams & Andersen, 1998).

As the integrated model (Weise-Bjornstal et al. 1998) suggests, once the sport injury occurs, the post injury factors include both personal (e.g. injury type and severity,

coping skills, self-motivation, and demographics) and situational (e.g. type of sport, time in season, social support system, and rehabilitation environment) variables. The personal and situational factors combine to determine how the individual appraises the injury. The appraisal of the injury then affects the emotional and behavioral responses, which in turn affect the rehabilitation outcome. The integrated model has received substantial support for each portion of the model. Sports injury has clearly been identified as a source of stress (Bianco et al 1999; Brewer & Petrie, 1995b; Ford & Gordon 1999; Gould et al 1997; Heniff et al 1999). Research has also asserted that many personal and situational factors influence responses to sports injury, (Brewer, 1994, 1998, 1999). As an individual experiences an injury, the individual will cope with the stress of the injury in variety of cognitive, emotional, and behavioral ways, (Bianco et al, 1999; Gould et al, 1997; Udry, 1997; Udry et al, 1997).

*Personal factors.* As mentioned, personal factors can impact how a person perceives an athletic injury. Personal factors include factors related to the injury itself and several personality characteristics that are likely to stay the same throughout much of a person's life (Brewer, 2005). The personal factors are categorized into four categories: injury status (e.g. injury type, severity, history), individual psychological differences (e.g. personality, self-motivation, athletic identity, pain tolerance, coping skills), demographics (e.g. age, gender, socioeconomic status), and physical attributes (e.g. physical health status, disordered eating). Brewer (1993) investigated the role athletic identity and injury status play in emotional response to injury. The study was conducted on 90 college football players and results showed that athletic identity and injury status were the



leading predictor variables of depression in the subjects. Brewer et al. (1995) examined 121 patients at a sports medicine clinic to assess the role age, gender, pain, social support, and athletic identity play in emotional adjustment to injury. While age, gender, social support, and athletic identity were found to be correlated with a negative reaction to injury, pain was not found to be significantly correlated with a negative emotional adjustment. Udry (1997) researched coping strategies of 25 sport and physical activity participants rehabilitating from anterior cruciate ligament (ACL) surgery. Results showed that instrumental coping was the most used strategy and was found to be a significant predictor of rehabilitation attendance.

Some other personal factors that have been explored to determine their effect on cognitive appraisals are: trait anxiety, self-esteem, self-motivation, coping skills, extraversion, neuroticism, psychological investment in sport, and injury history (Grove & Gordon, 1992; Petitpas & Danish, 1995; Rotella, 1985; Rotella & Heyman, 1993; Weiss & Troxel, 1986; Wiese & Weiss, 1987; Wiese-Bjornstal & Smith, 1993). The personal factors that are considered to represent physical attributes (health status, disordered eating) have not been empirically researched related to cognitive appraisal and injury, therefore their influence on cognitive appraisal is unknown at this time.

As mentioned, self-esteem is one construct that has been researched to understand how injury influences an individual's self-esteem. Self-esteem is defined as an individual's assessment of his or her own worth (Weiss & Ebbeck, 1996). Self-esteem has been assessed with global measures and domain specific measures of self-esteem. The research involving global measures has showed mixed results. Chan and Grossman

(1988) assessed self-esteem changes in runners and found that self-esteem was significantly lower in injured runners than in non-injured runners. However, when Brewer and Petrie (1995) compared the global measure of self-esteem between injured and non-injured college football players, they failed to show significant differences. The research examining domain specific measures of self-esteem has focused on physical self-esteem as being most impacted by injury. Brewer (1993) examined the physical self-esteem of injured athletes from a sports medicine clinic and found that the subscale was predictive of post-injury depression. In general, athletes' global self-esteem may be negatively impacted by an injury, but more specifically, an athlete's physical self-esteem is more directly impacted due to the nature of incurring an injury.

The extent of emotional distress that athletes experience in response to a physical injury varies greatly with the personal attributes of the athletes themselves and the context within which the physical injury occurred (Wiese & Weiss, 1987). Smith, Scott, and Wiese (1990) conducted a review of the literature on the individual differences in the emotional responses of injured athletes. The research they included suggested that mood disturbances, such as frustration, depression, and anger, were more apparent with more severely injured athletes. The mood disturbances were experienced simultaneously with lowered self-esteem. Younger injured athletes demonstrated more anger than older athletes, exemplifying either the importance of age and experience of dealing with injuries, or the perceived negativity of the situation in younger athletes. The experiences of the athletes ranged along a continuum from those who reportedly took their injury in

stride to those who experienced psychological consequences to the point of needing intervention.

*Situational factors.* Along with personal factors, another area of interest is the situational factors involved in the response to injury. Situational factors are unstable, variable aspects of the social and physical environments. The factors are in three categories; sport (e.g. type, time in season, level of competition), social (e.g. teammate and coach influence, social support provision, sport ethic), and environmental (e.g. accessibility to rehabilitation, and the rehabilitation environment). Research supports the link between the cognitive appraisal of the injury and the time of season, playing status, injury diagnosis, degree of impairment, and type and level of social support available to the athlete (Henschen & Shelly, 2007). Social support is one factor that has a complex relationship to cognitive appraisal. Part of the complexity is that social support is multidimensional and can be difficult to define, which has lead to challenges when operationally defining the variable and looking for a consensus amongst the research. Richman et al. (1993) proposed a description which has become the most widely used in sports injury rehabilitation research (Bianco & Orlick, 1996; Ford, 1998; Ford & Gordon, 1993; Izzo, 1994; Johnston & Carroll, 1998; LaMott, 1994; Quinn, 1996). Richman's structure identifies eight types of social support: listening support, emotional support, emotional challenge, task appreciation, task challenge, reality confirmation, material assistance, and personal assistance. It is important to note that the aspects can be provided by a variety of individuals (family, friends, teammates, coaches, medical personnel) for the athlete, (Bianco et al., 1999; Bianco & Orlick, 1996; Ford, 1998; Izzo,

1994; Johnston & Carroll, 1998; Lewis & LaMott, 1992; Macchi & Crossman, 1996; Peterson, 1997; Udry, 1997; Udry et al., 1997; Udry & Singleton, 1999). The needs of certain aspects of social support will also vary for the athlete during the rehabilitation process, (Ford, 1998; Johnston & Carroll, 1998; LaMott, 1994; Quinn, 1996; Udry, 1997). Social support is comprised of three sub constructs that represent its structural (support networks), functional (support exchanges), and perceptual (support appraisals) aspects (Vaux, 1988). Research has historically focused on examining the sub constructs independently. Research on the influences of social support on sport injury recovery (Bianco, 1999; Ford, 1999; Johnston & Carroll, 1998; Udry, 1997; Udry et al., 1997) suggest that social support helps relieve distress and enhances coping.

Brewer, Linder, and Phelps (1995) conducted a study to examine emotional adjustment to athletic injury as it relates to situational factors. The subjects were 121 patients (81 males and 40 females) at a sports medicine clinic. A battery of assessments was given which included: Postinjury Questionnaire (PQ), the Athletic Identity Measurement Scale (AIMS), the Beck Depression Inventory (BDI), and the Profile of Mood States (POMS). When researchers examined the role the situational factors played in the responses of the athletes, only a few were found to be strongly influential. Those influential factors were physician-rated current injury status, impairment of performance, and the level of social support available for the rehabilitation process. Interestingly, Brewer et al.'s results also showed that it is unlikely that any single situational factor will account for a large portion of the variance in emotional adjustment. Therefore, it is likely the combination of several situational factors that influence the cognitive appraisal.

*Emotional response.* The integrated model (Wiese-Bjornstal et al. 1998) proposes that cognitive appraisal, personal, and situational factors interact to influence emotional and behavioral responses to sport injury. The emotional response is important to understand and identify as research seeks to understand how athletes respond to injury. Folkman and Lazarus (1985) describe emotions as bi-products derived after the appraisal of a situation, and coping is described as the efforts (cognitively and behaviorally) to deal with the situation. For this reason, the Wiese-Bjornstal et al. (1998) model has cognitive appraisals as the mediating factor between personal and situational factors and emotional and behavioral responses. The majority of the research in this area has been centered on the direct relationships between some of the personal and situational factors and the emotional and behavioral responses. The emotional response piece of the model covers a variety of emotions (e.g. fear of the unknown, tension, positive outlook, and emotional coping). Research has indicated that athletes are likely to experience higher levels of emotional distress after an injury when they perceive the injury as serious, view themselves as having made slow rehabilitation progress, and consider themselves as lacking in support of their rehabilitation (Brewer & Cornelius, 2003). Researchers measuring emotional response at different points in the post injury process have demonstrated that athletes experience the greatest amount of emotional disturbance initially following the injury (Heil, 1993; Udry, 1997). For this reason, it is suggested that research on emotional response to injury should be conducted as soon as possible after injury occurrence, and interventions be available to reduce the effect of the emotional response.

Leddy, Lambert, and Ogles (1994) took a prospective route when they assessed the emotional response of 343 male collegiate athletes from 10 sports during preseason. All athletes were asked to complete the Beck Depression Inventory, the Stait-Trait Anxiety Inventory-Form Y, and the Tennessee Self-Concept Scale. Of the initial 343 subjects, 30 (8.7%) were injured at pretest, and 145 of the remaining athletes sustained at least one injury during the course of the season and were assessed post-injury. This resulted in a 47.8% injury rate for the sample. Results showed that 51% of the injured athletes had at least mild symptoms of depression at post-injury. This study suggests that elite-level athletes can be susceptible to experience severe emotional reactions to injury. Furthermore, some of these reactions can include high rates of depression, anxiety, and lower self-esteem. In certain circumstances the emotional reactions can be at the level of persons with clinical psychological diagnoses. Emotional feelings continue to be experienced after the onset of the injury and throughout rehabilitation.

In 1986, Weiss and Troxel qualitatively examined how athletes respond emotionally to injury. They selected 10 elite and collegiate athletes who were injured. They asked them to discuss what they found to be most difficult in dealing with injuries. The interviews revealed that the common responses to injury included fear, tension, fatigue, disbelief, depression, and somatic complaints (e.g., insomnia, loss of appetite, and upset stomach). Weiss and Troxel also found that many of the athletes they interviewed expressed an inability to cope with their injury, the long rehabilitation which followed the activity restriction, and the sense of not being in control due to the injury.

As researchers have progressed through the initial studies of emotional and psychological response to injury, more research is being conducted to further quantify an athlete's response. Quackenbush and Crossman (1994) surveyed 25 athletes (16 males, 9 females) who experienced and recovered from an athletic injury. Subjects were asked to complete a questionnaire that included a checklist to state which emotions they experienced. The checklist consisted of 48 adjectives to describe the emotions, 36 were negative, and 12 were positive. The researchers found that the emotions the athletes experienced were related to the amount of time that had passed since the injury occurred. For example, near the onset of injury, athletes reported more negative emotions such as frustration, anger, and discouragement. Once athletes approached the point when they would be returning to practice, the emotions shifted towards the positive, such as being optimistic and hopeful about the future. These results suggest that the emotions athletes experience largely depends on how much time has passed since the injury, and the emotions experienced vary over time

Tracey (2003) also studied the emotional experience of ten university student-athletes who had sustained a moderate to severe injury. She interviewed the subjects at 3 intervals: at the onset of injury, 1 week post-injury and 3 weeks post-injury. Interviewing the subjects at the 3 intervals facilitated the researcher in assessing how emotions changed over a period of time. The ten subjects expressed feelings of loss, lowered self-esteem, frustration, and anger throughout the three interviews. The athletes yet to return to their sport at 3 weeks post-injury were more likely to express these negative feelings than the athletes who were able to return by 3 weeks post-injury.

*Behavioral response.* The way that an individual interprets an injury also influences the behaviors of the individual after the injury occurrence. The Weise-Bjornstal (1998) integrated model describes behavioral responses to include: adherence to rehabilitation, risk-taking behaviors, effort and intensity, and behavioral coping. In general, these are the behaviors an individual who has experienced an injury might be observed doing in response to the stress of being injured. The two behaviors that have gained the most attention are coping behaviors and adherence to rehabilitation.

Coping behaviors are those behaviors athletes may exhibit as a way to assist them in coping with the injury. Research has identified specific behavioral strategies in athletes with injuries, these include an aggressive rehabilitation approach, avoiding others, increasing strength, distracting oneself from the injury, ‘driving through’ (e.g. doing things normally, seeking information about the injury, resting when tired, working hard to achieve rehabilitation goals), seeking out and using social support networks, trying different treatments, and working or training at their own pace (Bianco et al., 1999; Gould et al., 1997).

Adherence to rehabilitation (or the lack thereof) is a behavioral response that researchers are interested in as they seek to understand what factors impact an individual’s reluctance to complete prescribed rehabilitation activities. Adherence to the rehabilitation process incorporates several behaviors, including: (a) performing clinic-based activities, such as doing exercises designed to increase strength, flexibility and endurance; (b) modifying physical activity, such as resting and limiting activity; (c) taking medications; and (d) completing home based activities to support the rehabilitation



process (Brewer, 1998, 1999). Due to the extensive list of behaviors that might indicate adherence, there are a wide variety of methods for gathering that information.

Researchers have not been consistent in the means by which they operationally define adherence behavior and this is likely because the measure is dependent on the particular behaviors in question. Given the issues with consistent measures and operationalism of the behaviors, estimates of adherence to sports injury rehabilitation have ranged from 40 to 91%, (Brewer, 1998, 1999). Adherence rates are an important behavioral indication of the individual's cognitive appraisal of the injury. Research has found that adherence levels are linked to that appraisal of the injury and an individual's assessment of the recovery process. As mentioned previously, individuals who have high adherence rates report a high ability to cope with their injuries (Daly et al., 1995). While there are likely several pathways that connect adherence rates to coping ability, it is possible this internal assessment of the ability to cope effectively with an injury influences the individual's use of techniques to assist in the rehabilitation process. Individuals who feel capable of coping with the injury are more likely to set goals for rehabilitation, use imagery and positive self-talk (Scherzer et al., 1999). It is this adherence behavior that further impacts the rehabilitation outcome.

*Recovery outcomes.* The last aspect of the integrated cognitive appraisal model is centered on recovery outcomes. With recovery outcomes, this includes psychosocial and physical recovery from a sports injury. The model suggests that the same factors that influence an individual's response to the injury (e.g. personal, situational, cognitive, emotional, and behavioral) are also involved in the sports injury rehabilitation outcome.

Research on the personal factors that relate to sports injury rehabilitation outcome have linked some variables, but have not thoroughly explored the relationship. Recognition of the connection of personal factors to recovery outcome began when Wise et al., (1979) investigated subjects recovering from knee surgery. Researchers found that hysteria and hypochondriasis were inversely related to recovery from knee surgery. Subsequent studies sought to explore how other personal variables were related to injury recovery. Further research has found that being optimistic (LaMott, 1994), male (Johnson, 1996, 1997) and strongly identifying with the athletic role (Brewer et al., 2000) are positively related to sports injury rehabilitation outcomes. To date, researchers have not explored many of the personal factors, nor have they been able to explain the mechanisms that might explain the relationship between personal factors and recovery outcomes.

One of the situational factors involved with sports injury rehabilitation outcomes is social support. This variable has been the focus of a significant amount of research related to factors affecting sports injury rehabilitation outcomes. While many people intuitively believe social support is helpful for an athlete's rehabilitation outcome, the research has provided conflicting results. Tuffey (1991) found social support to be positively related, Brewer et al. (2000) found the variable not related, and Quinn and Fallon (2000) found social support to be negatively related to rehabilitation outcomes. Further research on this factor is needed to explore how the different types of social support might influence the rehabilitation outcome.

Research has identified numerous cognitive factors associated with rehabilitation outcomes. Some of the factors found to have a positive correlation with sports injury rehabilitation outcomes are attentional focus on healing (Loundagin & Fisher, 1993), cognitive appraisal of injury coping ability (Niedfeldt, 1998), positive attitude toward rehabilitation (Johnson, 1996, 1997), self-confidence (Johnson, 1996, 1997), use of goal setting (Gould et al., 1997; Ievleva & Orlick, 1991; Loundagin & Fisher, 1993), and use of imagery (Gould et al., 1997). In general, research suggests that positive cognitions and the use of psychological skills will enhance the recovery process, although more prospective and experimental research is suggested to gain a better understanding of how cognitive factors can influence recovery outcomes.

A limited number of studies have investigated the role emotional variables play with sport rehabilitation outcomes. Research has found positive relationships between rehabilitation outcomes and general well-being (Johnson, 1996, 1997) and vigor (Quinn, 1996), and negative relationships have been found for anger (LaMott, 1994; Alzate et al., 1998), anxiety (Johnson, 1996, 1997), fear, frustration, relief (LaMott, 1994), mood disturbance, depression (Alzate et al., 1998; Tripp, 2000), fatigue, tension (Alzate et al., 1998) and psychological distress (Brewer et al., 2000). Once again, researchers have not fully investigated how emotional factors relate to rehabilitation outcomes. Interestingly, many of the studies (i.e. Johnson, 1996, 1997; Alzate et al., 1998; Brewer et al., 2000; Quinn & Fallon, 2000) measured emotional variables at one point in time, and outcomes were assessed at a later point in time. Therefore, the research suggests that positive

emotions may precede positive rehabilitation outcomes, but the mechanisms that might enable this process are not fully understood.

The most popular behavioral factor researched in relation to sports injury rehabilitation outcomes is rehabilitation adherence. While the behavior has gained a significant amount of attention, the relationship with outcomes has been mixed. The relationship between adherence to rehabilitation and rehabilitation outcomes has been found to be positive (Alzate et al., 1998; Brewer et al., 2000; Derscheid & Feiring, 1987; Hawkins, 1989; Meani et al., 1986; Quinn & Fallon, 2000; Satterfield et al., 1990; Treacy et al., 1997; Tuffey, 1991), non-significant (Brewer et al., 2000; Noyes et al., 1983; Quinn & Fallon, 2000), and negative (Quinn & Fallon, 2000; Shelbourne & Wilckens, 1990). Obviously, as research has yet to reach a consensus, more stringent research is suggested to understand how rehabilitation adherence is related to rehabilitation outcomes. Some other behavioral factors that have been found to be positively related to rehabilitation outcomes are: higher levels of active coping (Quinn & Fallon, 1999), lower levels of physical activity (Gould et al., 1997), and higher levels of seeking social support (Gould et al., 1997; Johnson, 1996, 1997).

Cognitive appraisal models consider many levels of how an athlete might perceive an injury. The premise is that individuals have some pre-injury factors, and then once they are injured, the interaction between the personal factors and situational factors determine the cognitive appraisal of the injury. That cognitive appraisal then influences the behavioral and emotional response which together affects the recovery outcomes. It is important to note that this process is dynamic, and at different points the factors can be

influential at varying magnitudes. The model allows for individual differences in the response to injury. The research suggests that cognitive appraisal models are beneficial in understanding how an athlete responds to injury, and the models can serve as a guide for future studies on the emotional response to injury.

### **Basic Combat Training (BCT) Injuries**

BCT is a ten week process that serves to transform civilians to soldiers. BCT trainees go through a gradual increase in physical training, as well as immersion into weapons training. The gradual increase in physical training is not easy for anyone, but this is especially true for individuals who have been sedentary most of their lives. The Army has conducted several research studies looking at understanding BCT injuries and methods to prevent injuries during this time (Knapik, et al., 1999, 2002, 2008). Physical training is taken very seriously in the Army and the Army even has a U.S. Army Physical Fitness School (USAPFS), which was recently charged with redesigning how the Army conducts physical training (PT). The new PT program was changed for a variety of reasons, but one relevant reason was to reduce the number of injuries soldiers incur as a result of the mandatory PT sessions. Importantly, a significant portion of new recruit attrition occurs during BCT (General Accounting Office (GAO), 1997, 2000). In a study conducted to examine the PTRP unit and graduation rates Hauret et al. (2002) found that the discharge rates for Ft. Jackson between 1998 and 2001 were 9% for men and 15% for women. Exactly what percentage of the discharges is a result of an inability to recover from injury versus other reasons for discharge is not clear.

## **Similarities between Sport and Military**

The Army BCT is a tough, 10 week period that focuses on trainees developing basic soldier skills, as well as increasing their physical fitness. This process is commonly referred to as the soldierization process, as the mission is to transform a civilian into a soldier. The Army has a systematic process in which they steadily increase physical activity in order to prepare the new trainees for various tasks they will be required to do to successfully complete BCT. In military and sports tasks, individuals are often required to perform in a complex and dynamic environment and obtain a tactical advantage over an opponent even when only partial or incomplete information is available (Ward et al., 2008). It is this similarity that makes it likely that what works for the sports population would apply to the military. While research has not specifically established similarities between competitive athletes and the Armed Forces, it may be reasonable to assume that those similarities exist on the basis of the frequency and intensity of training. In BCT, new soldiers are doing physical activity every day, even if that only consists of marching from one training activity to another training activity. Knapik et al., (2007) conducted an interesting study in which they used electronic pedometers in an effort to quantify the physical activity of trainees during a 10 week U.S. Army BCT cycle. The study required 4 trainees in each of 10 BCT companies to wear the pedometers during all BCT activities. The investigators collected the readings daily and administered a brief questionnaire to ensure each subject wore the pedometer and completed the training each day. The researchers found that the average steps each day came to 7.27 miles, with the most

(10.07 miles) occurring during field training exercises. This study was the first of its kind and really helps to understand the amount of physical activity BCT trainees do.

Another similarity is that athletes and military personnel experience similar types of injuries. In a presentation to the American College of Sports Medicine's (ACSM) (2007), Brennan, Kane, & Jarvis stated, "With the exception of combat-specific traumatic injuries, there is no difference between the types of athletic injuries seen in the military and those seen in the civilian world." This being said, the question becomes, if soldiers experience the same types of injuries as athletes, how do the soldiers respond to those injuries?

### **Summary**

In conclusion, the research conducted with injured athletes demonstrates that many athletes experience a psychological response as a result of being injured. The severity of the emotional response can vary greatly and can depend on an athlete's cognitive appraisal of the injury situation. BCT soldiers experience regular intense physical training in ten weeks that in principle is similar to the physical training that athletes experience. Therefore, it is possible that injured BCT soldiers might have similar reactions to injury as athletes have been reported to have. To date, there is no known research that has been conducted to examine how BCT soldiers respond when they experience a non-combat injury. This lack of research limits our ability to contribute to the Army's efforts to assist the soldiers in their recovery process. The goal of the proposed study is to utilize Wiese-Bjornstal et al.'s (1998) integrated cognitive appraisal model to identify the cognitive appraisal of injured soldiers shortly after the injury has

occurred. Part of the process will be to identify some of the factors that influence the cognitive appraisal. Coping resources, soldier identity, social desirability, injury type, perception of injury severity, injury history, age, gender, amount of time completed in BCT, and self-motivation will be the factors this investigation will examine. This will lead to a better understanding of the impact the injury has on the soldier and what factors are involved with the cognitive appraisal. In the future, this research will also enable interventions to be tested as a means for mediating some of the factors influential in the cognitive appraisal process.



## CHAPTER III

### METHODS

#### **Overview of Research Design**

The overall objective of this research study is to describe the cognitive appraisal of BCT soldiers experiencing an injury significant enough to prevent them from continuing with training. Specifically this investigation examined variables related to the injury itself, individual difference variables, demographic variables, and time in BCT as predictors of cognitive appraisal. The approach was to gather the information through self-report surveys. Soldiers attending the Physical Therapy (PT) Clinic at Ft. Jackson, South Carolina were recruited to complete a demographic survey, a Soldier Identity scale, the Social Desirability Scale-17 (SDS-17), the Coping Resources Inventory, a cognitive appraisal assessment, and the Work Intensity Scale. As attendees of the clinic, the soldiers were evaluated by clinic staff. Information resulting from the evaluation was gathered to incorporate information related to the injury, such as type and recommendation.

#### **General Procedure**

After checking into the clinic, individual soldiers were called into a private waiting room to be informed of the research study, asked to participate, and informed that participation in the research study was voluntary. Informed consent was covered, as well as potential risks, benefits, and methods for maintaining confidentiality of the data. The

assessment was completed at the time the participants were in the PT clinic, after checking in with the clinic staff and while waiting to be seen. The individual was asked to sign the consent form, to allow data from the evaluation to be used in this study, and to complete a brief demographic questionnaire, the Work Intensity Scale, a Soldier Identity scale, the Social Desirability Scale, the Coping Resources Inventory, and two questions regarding Cognitive Appraisal. After clinic staff evaluated the soldier, a quick follow up was conducted to measure Cognitive appraisal of the situation, self-rated injury severity, perceived likelihood of success of recovery, as well as an anticipated length of time to 100% return to duty.

### **Participants**

Participants were 200 BCT soldiers between the ages of 18 and 42 years (age requirements for joining the Army/Age able to consent to be a participant) recruited from the Ft. Jackson, South Carolina Physical Therapy/Occupational Therapy (PT) Clinic at the Troop Medical Clinic. The number of subjects was chosen based on previous research in the area as well as estimates of the number of soldiers who are evaluated in the PT Clinic. Previous research examining the cognitive appraisal of injury involved sample sizes ranging from 5 to 343. The typical sample size in past research with injured athletes is approximately 30 subjects and the larger sample sizes are rare. The estimates provided by the PT Clinic suggested that 40-60 soldiers are evaluated in the clinic each day, (S.J. Scott, personal communication, September 16, 2010). At this rate, recruiting 20 soldiers each day was expected to require less than three weeks to reach the desired sample size. For this research, injury was defined as the inability to continue with

required training as scheduled. Soldiers are referred to the PT clinic when the chain of command is informed of an injury that prevents a soldier from participating in training. The soldiers in this study were waiting to see a clinic staff member regarding their injury. A physical therapist assessed the injury and made a recommendation to return to duty or referral to the Physical Training Rehabilitation Program (PTRP).

## **Measures**

### *Demographic Form*

Subjects were asked to complete demographic questions to gather a variety of information on the individual and the injury. Questions included prior sport experience (Have you ever played competitive sports/participated in organized activities such as dance? A negative response was 0; a positive response was 1. If so, which sports?), prior number of times injured (times unable to participate in training during BCT), and descriptions of previous injuries (i.e. List previously diagnosed injuries prior to BCT). Various questions were also asked on injury status (days injury has bothered you, days restricted from training), date injury began to bother them, and a brief previous injury history (i.e. Prior to BCT, did you ever injure bone, muscle, tendon, ligaments, and/or cartilage in one or both of your lower or upper limbs?”). A positive response to any of these questions was used to determine if a participant had experienced an injury in the past, 0 indicates no prior injury history and 1 indicates at least one injury prior to current injury.

### *Soldier Identity*

Participants were asked to respond to two questions related to if they identify themselves as a soldier. These questions were used to provide data reflecting soldier identity as a parallel to the athletic identity variable that is one of the individual difference variables in the Wiese-Bjornstal et al. (1998) integrated model. Responses were on a 7-point Likert scale, anchored by Strongly Disagree and Strongly Agree. The questions included “I consider myself a Soldier” and “I have many goals related to the military.” These questions were chosen based on the Athletic Identity Measurement Scale (AIMS), a well-known instrument in the sport psychology field which assesses the extent to which an athlete identifies with the athlete role. These two questions were modified to assess self-identity as it related to being a soldier. Higher numbers on the scale indicate higher levels of soldier identity.

### *Social Desirability Scale*

The Social Desirability scale was developed by Crowne and Marlowe (1960) in order to identify the extent to which individuals attempt to present themselves as similar to the norms of society. The original scale consisted of 33 items and showed the internal consistency of the scale as .88, and the test-retest correlation was .89. The scale has been utilized in the social science literature and several short forms have been developed over the years. In a report published in 2008, van de Mortel suggested that researchers using questionnaires that contain socially sensitive items should use a scale that assesses social desirability to detect and control for social desirability bias. The scale was used in this

study to control for the social desirability bias of self-report surveys. One of the short forms, the Strahan-Gerbasi X1 Scale is thought to be the most reliable short form to measure social desirability with an internal consistency estimated at 0.73 (Fischer & Fick, 1993; Fraboni & Cooper, 1989; and Loo & Thorpe, 2000). The scale consists of 10 items that describe desirable behavior. Participants were asked to respond to each item with True or False. The scale results in a score ranging from 0 to 10, with higher scores representing a higher degree of socially desirable responses.

#### *Work Intensity Scale*

The Work Intensity Scale is an instrument that has been used in research in the field of organizational and industrial psychology. The scale is often used to explore motivation and effort employees put forth in their job (Macey & Schneider, 2008; Piccolo, Greenbaum, den Hartog, & Folger, 2010; Pierro, Kruglanski, & Higgins, 2006). The scale, originally designed by Brown and Leigh (1996), is five items that seek to measure employee's tendencies to expend a lot of effort in order to be successful in their work. This measure was used to assess level of self-motivation as one of the individual difference variables from the integrated model (Wiese-Bjornstal et al., 1998). Time commitment and work intensity were measured on a 7 point Likert-type scale (anchored by strongly agree and strongly disagree). Brown and Leigh reported a Cronbach's Alpha ranging from .82 and .83. The original Work Intensity scale was modified in 2009 for an investigation on BCT soldiers and mental fitness at Ft. Jackson. The language in the scale was modified to better reflect the effort involved in training rather than 'work.' The

scale was condensed to a 5 point Likert-type scale (anchored by strongly disagree to strong agree) in an effort to maintain consistency with the rest of the measures used in this past study. The study conducted on over 2,000 BCT soldiers resulted in alpha's ranging from .90 to .95, (A.B. Adler, personal communication, August 23, 2010). This verbiage of the modified version was more appropriate to examine the effort and motivation involved with the training the BCT soldiers conduct as a part of their work for the Army. The Work Intensity Scale provides a single score that reflects motivation level with higher numbers indicating a higher level of effort put into training.

#### *Coping Resources Inventory*

The Coping Resources Inventory (CRI) is commonly used to measure five basic ways people handle stress. Hammer and Marting (1988) developed the CRI as a method for determining resources that are currently available to the individual in managing stress. The five scales are cognitive, social, emotional, spiritual/philosophical, and physical. The CRI is composed of sixty questions that require subjects to respond how often (Never, sometimes, often, always) the item describes their use of the coping resource in the last six months. A high rating (always) for each of the scales indicates the extent to which individuals utilize the coping resources in each of the five domains. The CRI provides 5 scores that were incorporated into the prediction of the cognitive appraisal of the injury, and total standardized score was compiled with higher scores representing higher level of coping resources.

### *Cognitive Appraisal*

Subjects were asked to respond to two statements. The statements, “I am experiencing stress due to my injury,” and “My injury is difficult to deal with” assess primary and secondary appraisal, respectively. Assessing cognitive appraisal using single item scales is supported by previous research (Albinson & Petrie, 2003; Daly et al. 1995; Ptacek, Smith & Zanas, 1992). In line with Daly et al. (1995) and Albinson and Petrie (2003) subjects rated each question on a 5-point Likert scale (0 = strongly disagree to 4 = strongly agree) with lower scores indicating less stress and increased ability in coping. Separate analyses were conducted for primary and secondary cognitive appraisal. Cognitive appraisal was assessed prior to injury evaluation and after the evaluation was completed. For the purpose of predicting cognitive appraisal, the assessment conducted before evaluation by the medical personnel was used to better determine how all the variables involved predict cognitive appraisal.

### *Physical Therapist's Form*

The physical therapist completing the evaluation of the injury was asked to provide the injury diagnosis for each participant. Once the diagnosis was received, each injury was categorized into either acute (caused by a single event) or chronic (caused by repeated events). Chronic =1, Acute = 2. The physical therapists on staff in the clinic informed the researcher which injuries were considered to be acute versus chronic.

### **Statistical Analyses**

Dependent samples t-tests were used to determine if primary cognitive appraisal, secondary cognitive appraisal, perception of injury severity, and perceived likelihood of recovering from the current injury and returning to duty changed as a function of being evaluated by the clinic staff. Hierarchical multiple regression analyses was used to examine injury history, perception of injury severity at baseline, injury type, motivation, social desirability, soldier identity, coping resources, gender, age, prior sport experience, and time completed in BCT as predictors of primary and secondary cognitive appraisal at baseline after controlling for the effect social desirability has on the analyses. This method was used to best determine the amount of variance in cognitive appraisal explained by the independent variables. Multivariate analysis of variance was used to test if primary and secondary cognitive appraisal at baseline differed as a function of injury type (acute, chronic).



## CHAPTER IV

### RESULTS

This investigation examined how variables related to the injury itself, individual difference variables, demographic variables, and time in BCT serve as predictors of primary and secondary cognitive appraisal of Soldiers experiencing an injury during BCT.

#### **Descriptive Statistics and Demographic Information**

Two hundred Basic Combat Training Soldiers being evaluated for an injury at Fort Jackson's Troop Medical Center, Physical Therapy Clinic completed the battery of survey instruments. Per the investigation protocol, participants were consented upon checking in with the clinic, and often had to wait several hours (up to eight hours) to be evaluated by the physical therapist. During this waiting period, participants completed the majority of the questionnaires for the study. After being evaluated by the physical therapists, the six follow up questions were administered and the physical therapists completed the diagnosis and recommendation portion of the study.

Eight participants left the clinic after waiting several hours without being evaluated for the injury. These eight left the clinic, returned to training and did

not return to the clinic for evaluation. Thus, the injury data and data related to the change in perception and cognitive appraisal following the evaluation are not available and they were not included in the final analysis. Four others left and returned at a later date for evaluation, usually the following day. These four did not complete the six follow-up questions to determine if their perception of the injury changed after evaluation and were not included in the regression analyses. Of the participants who took part in this investigation, 82 (41%) were male and 118 (59%) were female. The average age was 22.00 (SD=3.99), with a range from 18 to 42 years old. Table 1 represents the frequency and percentage breakdown for ethnicity, branch of the Army (Active, Reserve, National Guard), and participation in organized sports/activities for the participants.

*Table 1.*

*Demographic Information*

	Frequency	%
Caucasian	109	54.5
African American	50	25.0
Hispanic	21	10.5
Asian/Pacific Islander	11	5.5
Other	9	4.5
Active Duty	95	47.5
Army Reserve	35	17.5
National Guard	70	35.0
Participated in organized sports/activities prior to joining Army	147	73.5
Did not participate in organized sports/activities prior to joining Army	53	26.5

In response to questions addressing time of visit to clinic, on average a Soldier had been in BCT for 48.04 days (SD=30.08), with a range from 2 to 210 days. Basic Combat Training lasts approximately 70 days, so the greater number of days in BCT would indicate a Soldier has been recycled or restarted from the original unit they began with. The reason this might have happened would include lack of meeting the performance standards, discipline issues, or injury. Ten out of the 200 (5%) indicated they had seen a doctor for the same injury prior to joining the military, sometimes over a year prior to being seen in the PT clinic. The median number of days that had passed from when the Soldiers reported first noticing the injury until the visit to the clinic was

14.00 days. To determine if an individual had experienced an injury prior to the current injury, at any point in their life, a series of questions were included. Table 2 references participant prior injury history as well as the primary reason for the visit to the clinic.

*Table 2.*

*Prior Injury History and Primary Reason for Visit to Physical Therapy Clinic*

	Frequency	%
Never experienced an injury prior to current injury	22	11.0
Experienced at least one injury prior to current injury	178	89.0
Most important now: Continue training	99	49.5
Most important now: Decrease pain	27	13.5
Most important now: Diagnose your problem	25	12.5
Most important now: Learn how to manage injury without having to keep coming to sick call	18	9.0
Most important now: Want out of the Army	31	15.5

Included in the questionnaire were items to assess Soldier Identity, Work Intensity (an indication of self-motivation), Social Desirability Scale (SDS), and the Coping Resources Inventory (CRI). Descriptive information for soldier identity, work intensity, and social desirability are presented in Table 3.

Table 3.

*Soldier Identity, Work Intensity Scale, and Social Desirability Scale*

"I consider myself a Soldier"	Mean	SD
	4.85	1.58
"I have goals related to the military"		
	4.95	1.55
Work Intensity Scale (range 0-20)		
	17.16	3.40
Social Desirability Scale (range 1-10)		
	6.89	1.96

Participants (n=189) rated their perception of the severity of the injury prior to and following evaluation by the physical therapists. On average, injury severity was rated 3.05 (SD=0.92) on a scale of 1 to 5, with five representing Very Severe, 3 representing Moderately Severe, and 1 Not Severe. After being evaluated and having the injury diagnosed by the physical therapists, the perception of the severity of the injury lowered significantly,  $t(187) = 9.31, p=0.00$ , to 2.48 (SD=1.06). When asked to rate the likelihood of achieving a full recovery from the current injury and returning to duty, on average the responses were 3.81 (SD=1.17) on a scale of 1 to 5, with 5 representing Very Likely and 1 representing Not Likely. After evaluation by the physical therapist, participants reported the likelihood of recovering from the current injury and returning to duty of 2.58 (SD=0.62), this was a significant change,  $t(187) = 18.54, p=0.00$ . When asked to estimate the number of days they expected it to take to recover, the average was 20.40 days (SD=40.08) with a range from 0 to 180 days.

There were a wide variety of injuries, including shin splints, strains, sprains, stress fractures, tendonitis, and bursitis. Table 4 includes type of injury categorized as chronic/overuse or acute and recommendation by the physical therapist.

*Table 4.*

*Injury Type, Physical Therapist's Recommendation*

	Frequency	%
Chronic/Overuse	123	61.5
Acute	69	34.5
Physical Therapist Recommendation		
Return to BCT – No profile	33	16.5
Return to BCT – On profile	140	70.0
Recommend to PTRP	2	1.0
Other	17	8.5

*Note: Missing Data for 8 participants, BCT=Basic Combat Training, no profile would suggest either there is no injury or the injury will not be worsened by completing training, a profile is provided by medical professionals to limit specific physical activity by the trainee to prevent further injury and facilitate healing, PTRP= Physical Therapy Rehabilitation Program, Other= discharge from military or convalescence leave to allow for healing at home.*

Table 5.

*Cognitive Appraisal*

	Mean	SD
Primary cognitive appraisal prior to medical evaluation	2.94	1.10
Primary cognitive appraisal after medical evaluation	2.22	1.25
Secondary cognitive appraisal prior to medical evaluation	2.62	1.22
Secondary cognitive appraisal after medical evaluation	1.84	1.28

Average primary cognitive appraisal was 2.94 (SD=1.10) indicating that participants agreed with the statement “I am experiencing stress due to my injury” in the initial battery of questions. The average response to the question regarding secondary cognitive appraisal (“My injury is difficult to deal with”) was 2.62 (SD=1.22). Results from dependent samples t-tests showed that the evaluation by the physical therapists and subsequent injury diagnosis did affect the cognitive appraisal values, reducing the primary cognitive appraisal significantly,  $t(187)=9.73, p<.05$ , from 2.94 (SD=1.10) to 2.22 (SD=1.25), and reducing the secondary cognitive appraisal significantly,  $t(187)=11.10, p<0.01$ , from 2.62 (SD=1.22) to 1.84 (SD=1.28) for the 188 participants with complete data at both time points.

### **Data Analysis**

The research findings of this investigation are discussed in two sections. The first section is focused on Hypothesis 1 and addresses the results found through multiple regression analysis. The second section focuses on Hypothesis 2 and the results of

multivariate analysis of variance (MANOVA) analysis based on type of injury on primary and secondary cognitive appraisal.

### **Hypothesis 1**

Hypothesis 1 addresses the extent to which cognitive appraisal of injury, assessed before the evaluation, is predicted by injury history, injury severity, injury type, self-motivation, soldier identity, social desirability, coping resources, gender, age, prior sport experience, and length of time completed in BCT. Cognitive appraisal was assessed separately for Primary Cognitive appraisal and Secondary Cognitive appraisal.

Correlation and multiple regression analysis were conducted to examine the relationship between Primary Cognitive appraisal (Hypothesis 1a) and the hypothesized predictors, and between Secondary Cognitive appraisal (Hypothesis 1b) and the hypothesized predictors while controlling for the social desirability bias. Hypothesis 1a: Primary cognitive appraisal of injury will be predicted by eleven variables. In the regression analyses, gender was coded as 1 = male, 2 = female.

### **Correlation Analysis**

Table 6 presents the descriptive statistics and Table 7 contains the correlation matrix for the eleven predictor variables. As indicated in the table, primary cognitive appraisal is significantly correlated with participants' perception of severity of the injury ( $r=0.29$ ), soldier identity ( $r=-0.13$ ), social desirability ( $r=-0.23$ ), and coping resources ( $r=-0.34$ ).



*Table 6.*

*Descriptive Statistics*

	Mean	SD	N
Primary Cognitive Appraisal before evaluation	2.93	1.11	189
Prior injury history	3.48	0.69	189
Perception of injury severity before evaluation	3.05	0.93	189
Injury Type	1.36	0.48	189
Self-Motivation	17.18	3.41	189
Soldier Identity	9.77	3.00	189
Social Desirability	6.83	1.95	189
Coping Resources	55.02	10.76	189
Gender	1.58	0.50	189
Age	21.95	3.94	189
Prior participation in sports/competitive activity	1.26	0.44	189
Days since Began BCT	48.95	30.40	189

NOTE: SD = standard deviation

Table 7.

Correlation Matrix Hypothesis 1a

	1	2	3	4	5	6	7	8	9	10	11	12
1 Primary Cognitive Appraisal baseline	1.00	.01	.29	-.03	.00*	-.13**	-.23**	-.34**	.06	.00	.08	-.03
2. Prior Injury History	-.01	1.00	-.08	-.14	.14*	.10	.11	.03	.21*	.03	.05	.13
3. Perception of injury severity baseline	.29**	-.08	1.00	-.06	-.12*	-.14*	-.09	-.11	.01	-.00	.01	-.05
4. Injury Type	-.04	-.14	-.06	1.00	-.10	-.07	-.19*	-.04	.01	-.02	.04	-.17*
5. Self-Motivation	.00*	.14	-.12**	-.10	1.00	.54**	.15*	.38**	.04	.13	-.10	.17*
6. Soldier Identity	-.13**	.10	-.14*	-.07	.54**	1.00	.12	.27**	.23**	.13	-.17*	.16*
7. Social Desirability	-.23**	.11	-.09	-.19*	.15*	.12	1.00	.29**	.16*	.02	.16*	.01
8. Coping Resources	-.34**	.03	-.11	-.04	.38**	.27**	.29**	1.00	-.08	.15*	-.10	-.02
9. Gender	.06	.21*	.01	.01	.04	.23**	.16*	-.08	1.00	-.08	.02	.09
10. Age	.00	.03	-.00	-.02	.13*	.13*	.02	.15*	-.08	1.00	.02	-.02
11. Participated in organized sports/activity prior	.08	.05	.01	.04	-.10	-.17*	.16*	-.10	.02	.02	1.00	-.08
12. Time completed in BCT	-.03	.13*	-.05	-.17*	.17*	.17*	.01	-.02	.09	-.02	-.08	1.00

\* $p < 0.05$ , \*\* $p < 0.001$

## Regression Analysis

The multiple regression model for Hypothesis 1a, Primary Cognitive appraisal with eleven predictors was statistically significant,  $F(11,177)=4.67$ ,  $p<.001$ , and explained 24.9% of the variance. The significant predictors were soldier identity ( $p=.04$ ), social desirability ( $p=.001$ ), coping resources ( $p<.001$ ), and injury severity ( $p<.001$ ). When these predictors were entered into a regression that controlled for the social desirability bias, the regression accounted for 25% of the variance in primary cognitive appraisal. This included a 19.8% increase in the predicted variance by controlling for social desirability. The resultant prediction equation explaining 25% of the variance in Primary Cognitive Appraisal was:

$$\begin{aligned} \text{Primary Cognitive Appraisal} = & 3.07 - 0.10*\text{social desirability} + 0.01*\text{age} + \\ & 0.20*\text{gender} + 0.17*\text{organized sports} + 0.29*\text{injury severity} - 0.00*\text{days since began} \\ & \text{BCT} - 0.03*\text{coping resources} - 0.05*\text{soldier identity} + 0.08*\text{self-motivation} + \\ & 0.05*\text{injury history} - 0.15*\text{injury type}. \end{aligned}$$

Table 8.

*Beta Weights, t values, p values, Hypothesis 1a*

	b	$\beta$	t	p
Social desirability	-.10***	-.17	-2.34	.02
Age	.01	.04	.64	.52
Gender	.20	.09	1.23	.22
Participation in organized sports/activity	.17	.07	.99	.32
Perception of injury severity	.29***	.25	3.71	.00
Time completed in BCT	-.00	-.05	-.73	.47
Coping Resources	-.03***	-.31	-4.16	.00
Soldier Identity	-.05	-.13	-1.61	.11
Self-Motivation	.08**	.24	2.95	.00
Prior Injury History	.05	.01	.20	.85
Injury Type	-.15	-.06	-.94	.35

NOTE: \* =  $p < .05$ , \*\* =  $p < .01$ , \*\*\* =  $p < .001$

**Hypothesis 1b:** Secondary cognitive appraisal of injury will be predicted by injury history, injury severity, injury type, self-motivation, soldier identity, social desirability, coping resources, gender, age, prior sport experience, and length of time completed in BCT.

### Correlation Analysis

Table 9 presents the correlation matrix for the eleven predictor variables. As indicated in the table, secondary cognitive appraisal is significantly correlated with participants' perception of severity of the injury ( $r=0.51$ ), soldier identity ( $r= -0.17$ ),

social desirability ( $r = -0.19$ ), and coping resources ( $r = -0.31$ ). Experiencing difficulty in dealing with injury is related to an increased perception of the injury severity, identifying less as a soldier, expressing fewer socially desirable behaviors and utilizing fewer coping resources.

Table 9.

Correlation Matrix Hypothesis 1b

	1	2	3	4	5	6	7	8	9	10	11	12
1. Secondary Cognitive Appraisal baseline	1.00	-.06	.51**	-.05	-.09*	-.17**	-.19*	-.31**	.04	-.08	-.04	-.00
2. Prior Injury History	-.06	1.00	-.08	-.14*	.14*	.10	.11*	.03	.21*	.03	.05	.13
3. Perception of injury severity baseline	.51**	-.08	1.00	-.06	-.12*	-.14*	-.09	-.11	-.01	-.01	.01	-.05
4. Injury Type	-.05	-.14*	-.06	1.00	-.10	-.07	-.19*	-.04	.01	-.02	.04	-.17*
5. Self-Motivation	-.09*	.14*	-.12	-.10	1.00	.54**	.15*	.38**	.04	.13*	-.10	.17*
6. Soldier Identity	-.17*	.10	-.14*	-.07	.54**	1.00	.12	.27**	.23*	.13*	-.17*	.16*
7. Social Desirability	-.19*	.11*	-.09	-.19*	.15*	.12	1.00	.29**	.16*	.02	.16*	.01
8. Coping Resources	-.31**	.03	-.11	-.04	.38**	.27**	.29**	1.00	-.08	.15*	-.10	-.02
9. Gender	.04*	.21*	.01	.01	.04	.23*	.16*	-.08	1.00	-.08	.02	.09
10. Age	-.08	.03	-.00	-.02	.13*	.13*	.02	.15*	-.08	1.00	-.02	-.02
11. Participated in organized sports/ activity prior	-.04	.05	.01	.04	-.10	-.17*	.16*	-.10	.02	-.02	1.00	-.08
12. Time completed in BCT	-.00	.13*	-.05	-.17*	.17*	.16*	.01	-.02	.09	-.02	-.08	1.00

\* $p < 0.05$ , \*\* $p < 0.01$

## Regression Analysis

The multiple regression model for Hypothesis 1b, Secondary Cognitive Appraisal with eleven predictors was statistically significant,  $F(11,177)=8.47$ ,  $p<.001$ , and explained 34.9% of the variance. Examination of the significance levels for each predictor indicated that the significant predictors were injury severity ( $p<.001$ ), soldier identity ( $p=.009$ ), social desirability ( $p=.004$ ), and coping resources ( $p<.001$ ). When these predictors were entered into a regression that controlled for the social desirability bias, the regression accounted for 35% of the variance in predicting secondary cognitive appraisal. This included a 31.2% increase in the predicted variance by controlling for social desirability. excluded the non-significant predictors, the resultant prediction equation explaining 35% of the variance in Secondary Cognitive Appraisal is:

$$\begin{aligned} \text{Secondary Cognitive Appraisal} = & 2.83 - 0.06*\text{social desirability} - 0.01*\text{age} + 0.13*\text{gender} \\ & - 0.15*\text{organized sports} + 0.61*\text{injury severity} + 0.08*\text{days since began BCT} - \\ & 0.03*\text{coping resources} - 0.05*\text{soldier identity} + 0.05*\text{self-motivation} - 0.13*\text{injury} \\ & \text{history} - 0.12*\text{injury type} . \end{aligned}$$

Table 10.

*Beta Weights, t values, p values, Hypothesis 1b*

	b	$\beta$	t	p
Social desirability	-.06	-.09	-1.33	.19
Age	-.01	-.04	-.63	.53
Gender	.13	.05	.81	.42
Participation in organized sports/activity	-.15	-.05	-.83	.41
Perception of injury severity	.61***	.47	7.52	.00
Time completed in BCT	.01	.00	.03	.98
Coping Resources	-.03**	-.24	-3.46	.00
Soldier Identity	-.05	-.12	-1.56	.12
Self-Motivation	.05	.13	1.75	.08
Prior Injury History	-.13	-.03	-.52	.60
Injury Type	-.12	-.05	-.76	.45

NOTE: \* =  $p < .05$ , \*\* =  $p < .01$ , \*\*\* =  $p < .001$

## Hypothesis 2

The second hypothesis examined the extent to which primary and secondary cognitive appraisal of injury differ as a function of injury type. Based on a multivariate analysis of variance (MANOVA), there was not a statistically significant difference between participants' cognitive appraisal at baseline based on the type of injury (chronic or acute),  $F(2,188)=0.24$ ,  $p=.79$ , partial  $\eta^2=.001$ .



## **General Conclusions**

In summary, there were a number of significant findings in this investigation. First, individuals reporting more stress due to the injury (primary cognitive appraisal) identify less as a soldier, express fewer socially desirable behaviors, report using fewer coping resources, are female, and perceive the injury to be severe. Also, individuals reporting greater difficulties coping with the injury (secondary cognitive appraisal) identify less as a soldier, express fewer socially desirable behaviors, are female, and perceive the injury to be severe. In examining the second research question, it appears that there is no statistical evidence that cognitive appraisal is related to the diagnosed type of injury. This research is the first of its kind to assess cognitive appraisal of injury with entry level soldiers. The variety of variables assessed provides a starting point to better inform medical professionals treating these soldiers as well as other helping professionals designing interventions to assist soldiers in coping with the injury.

## CHAPTER V

### DISCUSSION

Research examining the response of entry level soldiers to injury is virtually non-existent. Research in the field of psychology of injury is also in the early phases as investigators are still working to determine factors involved with the cognitive appraisal of injury. The Wiese-Bjornstal et al. integrated model (1998) provides a starting point from which to begin to examine how a variety of factors might interact to predict the cognitive appraisal of the injury. Therefore, the purpose of the current investigation was to assess the cognitive appraisal of BCT soldiers experiencing an injury and to explore the extent to which some of the variables hypothesized in the integrated model predict cognitive appraisal.

In accordance with the Wiese-Bjornstal et al. integrated model (1998), it was hypothesized that injury history, severity, and type, as well as self-motivation, soldier identity, social desirability, coping resources, gender, age, prior sport/competitive experience, and time completed in BCT would serve as the best predictors of cognitive appraisal. These variables were identified through the literature as predictive of cognitive appraisal. However, this model was developed based upon research and experience with injured athletes. Thus, while soldiers experience similar levels of intense training as do athletes, there

may be differences in the population's response to injury due to the unique aspects of the soldier's experience. This discussion will highlight the significant findings as they relate to the hypotheses. Lastly, the strengths and limitations of the current investigation are addressed as well as future directions for further research.

### **Hypothesis 1**

Hypothesis 1 examined the extent to which cognitive appraisal of injury is predicted by variables related to the injury, individual differences, demographic, and situational variables.

Primary cognitive appraisal assesses the extent to which individuals report experiencing stress due to the injury. Perception of injury severity, soldier identity, social desirability, gender, and coping resources were found to be significant predictors of primary cognitive appraisal. Secondary cognitive appraisal separately examines the extent to which individuals believe that they have the necessary coping resources to deal appropriately with the stressor (injury). Multiple regression analysis identified perception of injury severity, coping resources, soldier identity, and social desirability as predicting secondary cognitive appraisal. The finding of perception of injury severity as a significant predictor of both primary and secondary cognitive appraisal is consistent with research as far back as Suinn (1967) as well as Brewer and Cornelius (2003). Of importance here is the fact that it is the individual's "perception" of the injury severity that is significantly related to the level of stress rather than the injury type as identified by the participant. Believing the injury to be more severe can exacerbate the stress experienced by the soldier.

Soldier identity was also found to be a significant predictor, which is consistent with Brewer's (1993, 1995) finding of athletic identity as a predictor of cognitive appraisal. What is different for this investigation, is that individuals with a strong soldier identity expressed experiencing less stress due to the injury and less difficulty coping with the injury. One aspect of the assessment for soldier identity relates to having goals related to the military. It is possible that the commitment to the military lessens the expression of stress and provides comfort in coping with the injury. Since 70% of the participants were returned to training on a profile (some limit on their activity), it is possible that the commitment to the military allows them to believe they can recover and continue training despite the injury. This investigation did not examine causality so it is difficult to develop a complete picture of the dynamic of soldier identity and cognitive appraisal. However, the implications are such that participants identifying as a soldier are possibly protected against the expression of stress and believe that they can appropriately cope with the injury. For professionals working with soldiers, this is vital knowledge to have as these soldiers may be motivated to follow the activity profile in order to heal, or they may believe they can continue training at a high intensity level despite the injury. The recommendation for these soldiers may be to closely monitor them to help them understand the injury needs time to heal and pushing through the pain may lead to more serious injury.

Social desirability was also found to be a significant predictor. This variable has not been included in previous literature with athletes as a predictor of cognitive appraisal so this is a unique finding. Results from this study indicate that less stress and less

difficulty coping was experienced by soldiers reporting higher levels of social desirability. It is possible that the desire to express socially desirable behaviors leads to less of a willingness to admit to experiencing stress and even more so an unwillingness to report having greater difficulties coping with the injury. It is also just as likely an explanation that in fact the participants experiencing more stress and an inability to cope due to the injury are more willing to be truthful about socially desirable behaviors that may in fact assist in lowering stress and impacting coping with the stress. In the multiple regression analysis, social desirability was controlled for, which allowed the remainder of the variables to significantly change for both primary and secondary cognitive appraisal.

Coping resources have previously been found to predict the expression of stress on sport injuries (Hardy, O'Connor, & Geisler, 1990; Maddison & Prapavessis, 2005; Petrie, 1993; Smith, Smoll, & Ptacek, 1990) as well as predict the expression of ability to cope with sport injuries (Udry, 1997) so the role in predicting primary and secondary cognitive appraisal is consistent with the literature on this area. Therefore, the reported perception of coping resources available to an individual will likely reduce the amount of stress an individual reports experiencing due to an injury. This finding is important for professionals working with injured BCT soldiers. The finding of the perception of coping resources predicting primary cognitive appraisal leads us to presume that teaching injured soldiers effective coping skills in order to better develop coping resources would assist in lowering the expression of stress due to the injury.

Given all of the variables found to significantly predict cognitive appraisal, it is difficult to ascertain the role of any single predictor. As Brewer et al. (1995) found, it is

not likely that any one variable will account for a large portion of the variance of cognitive appraisal. It is more likely that it is a combination of several variables from Wiese-Bjornstal et al.'s (1998) integrated model and possibly more that influence cognitive appraisal of injury. The variables assessed accounted for 25% and 35% of the variance in primary and secondary cognitive appraisal, respectively. This is an important step forward in this line of research. The research on cognitive appraisal of injury for entry level soldiers has tremendous potential for application in the initial military training environment. As the military invests resources into treating the injuries that soldiers experience, it is essential that theory and research advance the current literature to properly influence the advancement of treatment and interventions for injured soldiers. Explaining 25-35% of the variance in some of the factors that influence how individuals cognitively appraise an injury will also further inform the medical professionals treating the soldiers as to what variables might be signs that an individual is experiencing stress and an inability to cope with the injury.

Although this study was purely correlational in design, the findings can nonetheless be used to guide the military's efforts with injured BCT soldiers. Research in athletes has demonstrated that individuals who have high adherence rates to their rehabilitation program also report a high ability to cope with their injuries (Daly et al. 1995). How well athletes follow medical professional's instructions has direct implications for how quickly the injury heals (Brewer, 1994; Wiese-Bjornstal et al. 1998). The military is invested in the soldiers rehabilitation from injury and in order to provide the best possible chance of a successful recovery and return to duty, programs

designed to assist in teaching soldiers effective coping skills and stress management techniques should be available to injured BCT soldiers.

Hypothesis 2 investigated the extent to which primary and secondary cognitive appraisal of injury differs as a function of injury type. Considering that previous research (Smith, Scott, & Weise, 1990) found injury type to be associated with response to injury, it is interesting that there was not a statistically significant difference in primary and secondary cognitive appraisal of injury based on injury type. While type of injury was operationalized similarly to previous research, the previous research included a higher percentage of acute injuries such as sprains and few stress reactions. Basically, being injured itself seemed to be the stressor and the type of injury was not a significant factor. Since the majority (86.5%) of the participants were to return to training and the injury might not prevent them from achieving the goal of graduating from BCT, the type of injury may not be that big of a factor in the stress that they express or the ability to cope with the injury.

### **Summary**

Overall, this investigation suggests that perception of injury severity, coping resources, soldier identity, and social desirability are predictive of both primary and secondary cognitive appraisal. As Brewer et al. (1995) found, it is unlikely that any single factor will account for a large portion of the variance in cognitive appraisal. More likely it is a combination of several personal and situational factors that influence

cognitive appraisal and this investigation has identified several variables that predict cognitive appraisal in BCT soldiers.

### **Strengths and Limitations**

The current investigation had several strengths. First, the current study had an adequate sample size (N=188) to examine the predictive value for multiple variables. Research involving cognitive appraisal often has a small sample size and is therefore typically limited in terms of the number of factors in the model that can be tested. Second, the sample has good representation with regards to gender, age, and ethnicity which increases the extent to which the results could be generalized to other representative samples of injured soldiers. Another strength of this investigation was that it assessed multiple variables of Wiese-Bjornstal et al.'s (1998) integrated model of cognitive appraisal. Rather than focus on one aspect of the model, several personal and situational factors were included to determine significant predictor variables of both primary and secondary appraisal.

There were several limitations of this investigation as well. First, the lack of adequate measures available to measure some of the personal and situational factors involved in response to injury. For example, Wiese-Bjornstal et al.'s (1998) model includes health status, social support, and family dynamics, but due to the lack of previous research in this area, measurement tools have not been developed to investigate these factors in soldiers. To further explore this limitation, social support provides a good example of a variable that may be uniquely defined in soldiers. Family support for



joining the military, support from peers inside and outside of the military, and support from leaders in the military are all possible sources of social support for soldiers and should be incorporated into an instrument specifically designed for this population. Also, the method that soldiers go through to obtain medical treatment can be uncertain. BCT can be a very hectic ten weeks that leaves very little personal time each day and to seek out medical treatment requires missing training. Most training events (basic rifle marksmanship qualification, Victory Forge) are scheduled for a specific time on the training calendar and because of the volume of soldiers trained on the base, it can be very difficult to make up that training if it is missed. For this reason, many soldiers do not seek out medical care for fear of missing vital training events, which would prevent them from graduating from BCT. Some soldiers obtain treatment from the athletic trainer assigned to the unit, but the level of access to that resource is not consistent. It is possible that different results would have been observed if the population used was the soldiers who only attend sick call with the athletic trainers. The athletic trainers are more likely to see the injuries before they reach the chronic/overuse stage of injury. Another limitation of this research is the measures to assess primary and cognitive appraisal. While this measure has been used in previous research (Albinson & Petrie, 2003) to examine cognitive appraisal, there are other measures that might provide further insight into the cognitive appraisal of injury.

### **Future Directions**

Based on the results of this investigation, additional investigations examining possible predictors of cognitive appraisal should be conducted, as it is possible that further personal and situational factors might be significant in predicting primary and secondary cognitive appraisal. Social support was one factor that was not examined in this current investigation that could potentially be found to be a significant contributor to predicting cognitive appraisal. Future research should include this factor as well as additional factors related to the injury itself, to pain level, and to perceived cause of injury. Other factors that might be interesting to include in future research are personality characteristics, mood states, goal adjustment, other social factors such as ‘sport’ ethic, behavioral and emotional coping, and malingering. Lastly, it is important to recognize that the influence that the intense environment plays can impact how soon an individual seeks out medical treatment. The military culture is often seen as having a ‘suck it up’ and ‘drive on’ mentality that could lead entry level soldiers to ignore significant pains in hopes that they can stick it out and graduate BCT. Thus, the soldiers who were seen in the clinic may not be representative of all soldiers experiencing injuries in BCT. This mentality is also something that warrants future investigation. A larger, longitudinal research study is currently being conducted in extension of this study that includes a total of 500 participants and those that are assigned to the PTRP for more significant injury rehabilitation. These participants will be re-assessed for perception of injury and recovery rate as well as primary and secondary cognitive appraisal and social

support. This study will further the existing knowledge base and provide insight into the evolution of cognitive appraisal throughout the injury rehabilitation process.

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## **APPENDIX A**

### **CONSENT TO ACT AS A HUMAN PARTICIPANT**

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## VOLUNTEER AGREEMENT AFFIDAVIT

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For use of this form, see AR 70-25 or AR 40-38; the proponent agency is OTSG

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### PRIVACY ACT OF 1974

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Authority: 10 USC 3013, 44 USC 3101 and 10 USC 1071-1087

Principle Purpose: To document voluntary participation in the Clinical Investigation and Research Program. The home address will be used for locating purposes.

Routine Uses: The home address will be used locating purposes. Information derived from the study will be used to document the study; implementation of medical programs; adjudication of claims; and for the mandatory reporting of medical conditions as required by law. Information may be furnished to Federal, State and local agencies.

Disclosure: The furnishing of your home address is mandatory and necessary to contact you if future information indicates that your health may be adversely affected. Failure to provide the information may preclude your voluntary participation in this investigational study.

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## PART A - VOLUNTEER AFFIDAVIT

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### Volunteer Subjects in Approved Department of the Army Research Studies

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Volunteers under the provisions of AR 40-38 and AR 70-25 are authorized all necessary medical care for injury or disease which is the proximate result of their participation in such studies.

I, \_\_\_\_\_ having full capacity to consent and having attained my \_\_\_\_\_ birthday, do hereby volunteer to participate in the research protocol Basic Combat Training Soldier's Cognitive Appraisal of Injury under the direction of **Treva Anderson, M.S.** and Dr. Jennifer Etnier, conducted at Moncrief Army Community Hospital.

The implications of my voluntary participation; the nature, duration and purpose of the research study; the methods and means by which it is to be conducted; and the inconveniences and hazards that may reasonably be expected have been explained to me by \_\_\_\_\_.

I have been given an opportunity to ask questions concerning this investigational study. Any such questions were answered to my full and complete satisfaction. **Should any further questions arise concerning my rights on study-related injury I may contact the Staff Judge Advocate at Ft. Jackson, (803) 751-7657.**

I may at any time during the course of this study revoke my consent and withdraw from

the study without further penalty or loss of benefits; however, I may be required (military volunteer) or requested (civilian volunteer) to undergo certain examinations if, in the opinion of the investigator, such examinations are necessary for my health and well-being. My refusal to participate will involve no penalty or loss of benefits to which I am otherwise entitled.

## PART B - EXPLANATION OF WHAT IS TO BE DONE

**DESCRIPTION:** You are invited to participate in this research study on your thoughts about your injury. A total of 500 individuals will be included in this study. The aim of this study is to begin to understand how the way you view your injury is affected by your own personal situation and experiences. The research will ask you to complete up to three questionnaires.

You will be asked to complete a questionnaire that seeks information about you and the injury you are seeking medical attention for. This questionnaire will take you approximately 15 minutes to complete.

After you are evaluated by the Physical Therapy staff, you will be asked to complete a second questionnaire regarding your thoughts on your injury. This second questionnaire will take you about 5 minutes to complete. The PT clinic staff will provide the researcher with your medical diagnosis and the recommendation for treatment.

If you are sent to the Physical Training Rehabilitation Program due to your injury, there will be a third and final questionnaire. Ms. Anderson will record the length of time you are in the unit.

**FOR QUESTIONS ABOUT THE STUDY, CONTACT:** Treva Anderson, 3216 Magruder Ave, Columbia, SC, 239-313-1269, or Dr. Jennifer Etnier, (336) 334-3037.

**RISKS AND BENEFITS:** The risks associated with participation in this study are minimal. Some of the questions will ask you how you feel about your injury. These questions might bring up unpleasant emotions. If any of the questions on the questionnaire make you uncomfortable, you do not have to complete them. If you experience any distress while completing the questionnaire regarding the injury experience, please alert the researcher. You may voluntarily withdraw from the study without penalty for any reason. Your decision whether or not to participate in this study will not affect your medical care. The PI may terminate your participation if deemed necessary.

There are no direct benefits to you for participating in this study.

**CONFIDENTIALITY OF RECORDS:** The case records from this study will be kept in a locked file cabinet maintained by Mrs. Treva Anderson. Mrs. Anderson will be the only personnel to have direct access to the completed surveys. Your individual privacy will be maintained in all published and written data resulting from the study.

**TIME INVOLVEMENT:** Your participation in this research will take approximately 20 minutes total today - 15 minutes for the first set of questions, and less than 5 minutes for a second set of questions after being evaluated. In the event you are sent to PTRP, a third set of questions will be requested after 30 days and will take approximately 10 minutes to complete.

**SUBJECT'S RIGHTS:** If you have read this form and have decided to participate in this project, please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled.

Your individual privacy will be maintained in all published and written data resulting from the study.

You are encouraged to ask any questions, at any time, that will help you to understand how this study will be performed and/or how it will affect you. **You may contact Treva Anderson, 239-313-1269, or Dr. Jennifer Etnier, (336) 334-3037.**

**Also if you have any questions or concerns about this study or your rights as a study subject you may contact the Institutional Review Board, DDEAMC Army Medical Center, Ft Gordon, GA 30905, (706) 787-2387, or Mr. Eric Allen in the Office of Research Compliance at UNCG at (336) 256-1482.**

IF THERE IS ANY PORTION OF THIS EXPLANATION THAT YOU DO NOT UNDERSTAND, ASK THE INVESTIGATOR BEFORE AGREEING TO PARTICIPATE IN THIS STUDY.

**You will be given a copy of this consent document for your records.**

**I do ☐ do not ☐ (check one & initial) consent to the inclusion of this form in my outpatient medical treatment record.**

SIGNATURE OF VOLUNTEER	DATE	PRINTED NAME OF VOLUNTEER
PERMANENT ADDRESS OF VOLUNTEER		



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Name of person administering consent: \_\_\_\_\_

Signature of person administering consent: \_\_\_\_\_ Date: \_\_\_\_\_

**APPENDIX B**

**SURVEY INSTRUMENTS**

## Basic Combat Training Soldier's Cognitive Appraisal of Injury Questionnaire

1. Subject # \_\_\_\_\_ Date: \_\_\_\_\_
2. Rank \_\_\_\_\_
3. Age \_\_\_\_\_
4. Please indicate your ethnicity  
☐ 1-Caucasian/White      ☐ 2-African American      ☐ 3-Hispanic  
☐ 4-Asian/Pacific Islander      ☐ 5-Other
5. Please indicate your gender  
☐ 1-Male      ☐ 2-Female
6. What is your component?  
☐ 1-Regular Army      ☐ 2-Army Reserve      ☐ 3-National Guard
7. When did you begin basic training? **(Do not include the reception station)**  
1\_\_1\_\_1\_\_1\_\_1\_\_1\_\_1\_\_1\_\_1\_\_1\_\_  
MONTH      DAY      YEAR
8. Did you participate in organized sports or related activities in High School or after High School?  
☐ 1-Yes      ☐ 2-No  
  
If yes, Please list which sports (or other organized activities such as dance) you participated in and the level at which you played (i.e., High School, Club, College):  
\_\_\_\_\_  
\_\_\_\_\_
9. How many times have you been injured (time loss from training) during BCT?  
\_\_\_\_\_

Please list any previously diagnosed injuries

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10. Please rate your perception of how severe your current injury is:

1	2	3	4	5
Not Severe		Moderately Severe		Very
Severe				

11. Please rate how likely you are to achieve a full recovery from your current injury and return to duty:

1	2	3	4	5
Not Likely		Moderately Likely		Very
Likely				

12. Which of the following is the most important thing to you right now (PICK ONLY ONE)?

- ☐ 1-Continue Training
- ☐ 2-Decrease pain
- ☐ 3-Diagnose your problem
- ☐ 4-Learn how to manage your injury without having to keep coming to sick call
- ☐ 5-Want out of the Army

13. When did the current injury first bother you (to the best of your knowledge)?

1\_\_1\_\_1/1\_\_1\_\_1/1\_\_1\_\_1\_\_1\_\_1  
MONTH DAY YEAR

14. What were you doing when you first noticed your injury?

- ☐ 1-Injury occurred gradually over time
- ☐ 2-Riding in motorized vehicle
- ☐ 3-Foot marching
- ☐ 4-Running for physical training (PT)
- ☐ 5-Physical training (PT) other than running
- ☐ 6-Physical training (PT) test
- ☐ 7-Pugil stick training
- ☐ 8-Obstacle/confidence course
- ☐ 9-Barracks activities
- ☐ 10-Combatives
- ☐ 11-Field training

15. Have you previously sought medical care for this injury in Basic Combat Training?
- ☐ 1-Yes, if yes, how many times (including this time)? \_\_\_\_\_ times
- ☐ 2-No
16. Have you previously been given a profile for this specific injury in Basic Combat Training?
- ☐ 1-Yes, if yes, how many days? \_\_\_\_\_ days
- ☐ 2-No
17. Have you previously had surgery for this injury?
- ☐ 1-Yes, if yes, date of surgery
- 1\_\_1\_\_1/1\_\_1\_\_1/1\_\_1\_\_1\_\_1\_\_1
- MONTH DAY YEAR
- ☐ 2-No
18. Were you seen by a doctor for this injury prior to joining the military?
- ☐ 1-Yes
- ☐ 2-No
19. If you had this injury previously, when did you first get injured? (If you did not have this injury previously, write zeros in each block).
- 1\_\_1\_\_1/1\_\_1\_\_1/1\_\_1\_\_1\_\_1\_\_1
- MONTH DAY YEAR
20. Have you been in PTRP before?
- ☐ 1-Yes
- ☐ 2-No
21. Prior to Basic Combat Training, did you ever injure bone, muscle, tendon, ligaments, and/or cartilage in one or both of your lower limbs (feet, ankles, legs, knees, or hips)?
- ☐ 1-Yes
- ☐ 2-No

22. Following these lower limb injuries from the previous question, were you able to eventually return to 100% of your normal physical activities?

- ☐ 1-Does not apply, never had lower limb injury  
☐ 2-Yes  
☐ 3-No

23. Prior to Basic Combat Training, did you ever injure bone, muscle, tendon, ligaments, and/or cartilage in one or both of your upper limbs (hands, wrist, arms, elbows, or shoulders)?

- ☐ 1-Yes  
☐ 2-No

24. Following these upper limb injuries from the previous question, were you able to eventually return to 100% of your normal physical activities?

- ☐ 1-Does not apply, never had upper limb injury  
☐ 2-Yes  
☐ 3-No

### **Soldier Identity**

<b>Please rate how much you agree or disagree with the following statements.</b>	<b>0 Strongly Disagree</b>	<b>1 Moderately Disagree</b>	<b>2 Slightly Disagree</b>	<b>3 Neutral</b>	<b>4 Slightly Agree</b>	<b>5 Moderately Agree</b>	<b>6 Strongly Agree</b>
25. I consider myself a Soldier							
26. I have goals related to the military							

### Work Intensity

<b>Please rate how much you agree or disagree with the following statements relative to your desire to put in effort during BCT.</b>	<b>0 Strongly Disagree</b>	<b>1 Disagree</b>	<b>2 Neutral</b>	<b>3 Agree</b>	<b>4 Strongly Agree</b>
27. When there's a task to be done, I devote all my energy to getting it done					
28. When I train, I do so with intensity					
29. I train at my full capacity in all of my tasks					
30. I strive as hard as I can to be successful in my training					
31. When I train, I really exert myself to the fullest					

### Cognitive Appraisal

<b>Please rate how much you agree or disagree with the following statements.</b>	<b>0 Strongly Disagree</b>	<b>1 Disagree</b>	<b>2 Neutral</b>	<b>3 Agree</b>	<b>4 Strongly Agree</b>
32. I am experiencing stress due to my injury					
33. My injury is difficult to deal with					

### Social Desirability Scale

Please indicate if the statements below describe you or not. If the item describes you, indicate "True," if not, indicate "False"	True	False
34. You are always willing to admit it when you make a mistake		
35. You always try to practice what you preach		
36. You never resent being asked to return a favor		
37. You have never been annoyed when people expressed ideas very different from your own		
38. You have never deliberately said something that hurt someone's feelings		
39. You like to gossip at times		
40. There have been occasions when you took advantage of someone		
41. You sometimes try to get even rather than forgive and forget		
42. At times you have really insisted on having things your own way		
43. There have been occasions when you felt like smashing things		

### Coping Resources Inventory

Directions: For each of the sixty statements that follow, mark an X for the response that best describes you in the *last six months*. For each statement mark one of the following descriptions:

N (1)	S (2)	O (3)	A (4)			
Never or Rarely	Sometimes	Often	Always or almost always			
44.	I have plenty of energy		N	S	O	A
45.	I say what I need or want without making excuses or dropping hints		N	S	O	A
46.	I like myself		N	S	O	A
47.	I am comfortable with the number of friends I have		N	S	O	A
48.	I eat junk food		N	S	O	A
49.	I feel as worthwhile as anyone else		N	S	O	A
50.	I am happy		N	S	O	A
51.	I am comfortable talking to strangers		N	S	O	A
52.	I am part of a group, other than my family, that cares about me		N	S	O	A
53.	I accept the mysteries of life and death		N	S	O	A



54.	I see myself as loveable	N	S	O	A
55.	I actively look for the positive side of people and situations	N	S	O	A
56.	I exercise vigorously 3-4 times per week	N	S	O	A
57.	I accept compliments easily	N	S	O	A
58.	I show others when I care about them	N	S	O	A
59.	I believe that people are willing to have me talk about my feelings	N	S	O	A
60.	I can show it when I am sad	N	S	O	A
61.	I am aware of my good qualities	N	S	O	A
62.	I express my feelings to close friends	N	S	O	A
63.	I can make sense out of my world	N	S	O	A
64.	My weight is within 5 lbs. of what it should be	N	S	O	A
65.	I believe in a power greater than myself	N	S	O	A
66.	I actively pursue happiness	N	S	O	A
67.	I can tell other people when I am hurt	N	S	O	A
68.	I encourage others to talk about their feelings	N	S	O	A
69.	I like my body	N	S	O	A
70.	I initiate contact with people	N	S	O	A
71.	I confide in my friends	N	S	O	A
72.	I can cry when sad	N	S	O	A
73.	I want to be of service to others	N	S	O	A
74.	I can say what I need or want without putting others down	N	S	O	A
75.	I accept problems that I cannot change	N	S	O	A
76.	I know what is important in life	N	S	O	A
77.	I admit when I'm afraid of something	N	S	O	A
78.	I enjoy being with people	N	S	O	A
79.	I am tired	N	S	O	A
80.	I express my feelings clearly and directly	N	S	O	A

81.	Certain traditions play an important part in my life	N	S	O	A
82.	I express my feelings of joy	N	S	O	A
83.	I can identify my emotions	N	S	O	A
84.	I attend church or religious meetings	N	S	O	A
85.	I do stretching exercises	N	S	O	A
86.	I eat well-balanced meals	N	S	O	A
87.	I pray or meditate	N	S	O	A
88.	I accept my feelings of anger	N	S	O	A
89.	I seek to grow spiritually	N	S	O	A
90.	I can express my feelings of anger	N	S	O	A
91.	My values and beliefs help me to meet daily challenges	N	S	O	A
92.	I put myself down	N	S	O	A
93.	I get along well with others	N	S	O	A
94.	I snack between meals	N	S	O	A
95.	I take time to reflect on my life	N	S	O	A
96.	Other people like me	N	S	O	A
97.	I laugh wholeheartedly	N	S	O	A
98.	I am optimistic about my future	N	S	O	A
99.	I get enough sleep	N	S	O	A
100.	My emotional life is stable	N	S	O	A
101.	I feel that no one cares about me	N	S	O	A
102.	I am shy	N	S	O	A
103.	I am in good physical shape	N	S	O	A

*Thank you*

\*\*\*\*\*Please Stop Here\*\*\*\*\*

***Complete Only After Evaluation by Physical Therapy Clinic Staff***

1. Subject Number \_\_\_\_\_

2. Please rate your perception of how severe your current injury is:

1                                  2                                  3                                  4                                  5  
Not Severe    Moderately Severe    Very Severe

3. Please rate how likely you are to achieve a full recovery from your current injury and return to duty:

0                                  1                                  2  
Not Likely at all                                  Likely                                  Very Likely

4. Please indicate how long you anticipate it will take for you to return to duty (please only indicate one of the values below:

\_\_\_\_\_ days **OR** \_\_\_\_\_ weeks **OR** \_\_\_\_\_ months

**Cognitive Appraisal**

Please rate how much you agree or disagree with the following statements.	0 Strongly Disagree	1 Disagree	2 Neutral	3 Agree	4 Strongly Agree
44. I am experiencing stress due to my injury					
45. My injury is difficult to deal with					

## ***Physical Therapist Evaluation***

Soldier's Name: \_\_\_\_\_

Diagnosis:

\_\_\_\_\_

Recommendation:

☐ 0-Return to BCT (no profile)

☐ 1-Return to BCT (on profile)

☐ 2-PTRP

Likelihood of PTRP Success/RTD: ☐ 1-High      ☐ 2-Medium      ☐ 3-Low

☐ 3-Other (please explain): \_\_\_\_\_